Published monthly by Simmons-Boardman Publishing Corporation, 105 W. Adams St., Chicago, Ill. Subscription price: United States and Possessions, and Canada, $2.00; Foreign, $3.00. Single copies 35 cents. Entered as second-class matter January 20, 1933, at the postoffice at Chicago, Ill., under the act of March 3, 1879, with additional entry at Mount Morris, Ill., postoffice. Address communications to 105 W. Adams St., Chicago, Ill.

. . . . But how can we carry on our rust prevention program with fewer men?

Dispense with pre-cleaning. It's unnecessary when you use NO-OX-ID

That's dead right! NO-OX-ID can be applied right over rusted surfaces. When applied over rusty surfaces, NO-OX-ID stops corrosion and loosens rust scale. Later, touching up of bare spots where the rust scale has fallen off completes the job. The hours ordinarily devoted to expensive pre-cleaning can be utilized for the actual coating.

NO-OX-ID provides two-way protection, mechanically by excluding moisture and oxygen and chemically by inhibiting underfilm corrosion. It's the general all-around rust preventive for all steel-protecting jobs on railroads.

Dearborn chemists and laboratory assistants are always available for consultation. They stand right back of the Dearborn men who call upon you to supplement their service with time-saving suggestions and advice.

"THE LEADER FOR 25 YEARS"

NO-OX-ID

IRON + OX = RUST

rust preventive

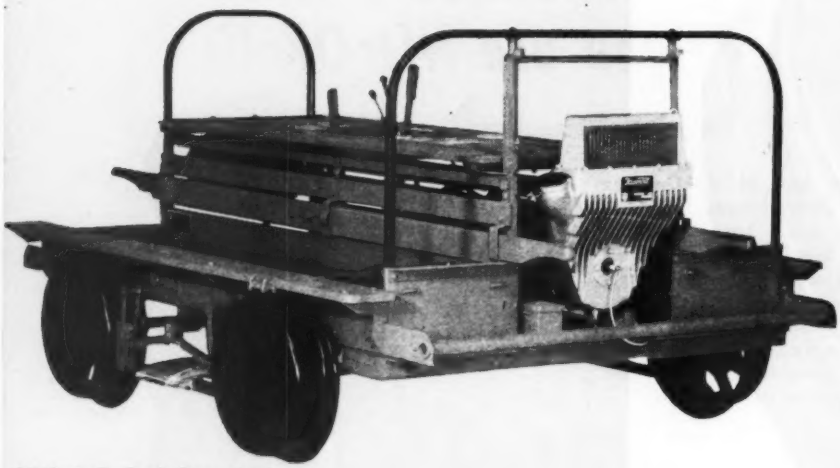
DEARBORN CHEMICAL COMPANY

Dept. U, 310 S. Michigan Ave., Chicago

NEW YORK • LOS ANGELES • TORONTO

Mobilized!

M9 Series D—Ideal 1-2 man car with generous tool space. Safe, flexible and economical. Powered by famous 5-8 H.P. R O Hy-Load Roller Bearing Engine. Full details, Bulletin 391.



M14 Series G—Sturdy. Powered and built for 6 man section gang work. Yet light enough for one or two man handling. Fully described in Bulletin 397.

A5 Series C—A 3-6 man car that measures up to heavy loads and tough grades. 36 H.P. 4 cyl. Waukesha Engine and 4 speed (forward or reverse) transmission for smooth performance. See Bulletin 385.

IN the battle of transportation the vigil of the maintenance force must be sharper, the motorized equipment they use must be of proved dependability . . . capable of saving critical time to crowd extra minutes and extra hours into each working shift.

To this branch of service, Fairmont has mobilized the most complete and most versatile line in the world . . . cars so broad in their range of utility that they blanket the entire needs of Inspection and Maintenance Departments.

It is typical of farsighted engineering and construction that every Fairmont Car fits the "emergency" role of today . . . that each car is fitted to do the maximum number of jobs with the least demand upon available manpower.

Notable in this respect is the fact that Fairmont Cars rated for 2, 4, 6, and 8 man jobs can be safely and easily handled. The explanation lies in distribution of weight for perfect balance, the result of careful engineering without sacrifice of rugged strength to match the heavier jobs.

OF ALL THE CARS IN SERVICE TODAY

for Service

M19 Series E—1-4 man car. Extension lift only 96 lbs. Spring mounted chassis for smooth riding. 5-8 H.P. R O Hy-Load Roller Bearing Engine for ample reserve power. Bulletin 396.

In addition to "doubling up" on many jobs, Fairmont Cars are so simplified in construction and accessibility that they operate smoothly and steadily for longer periods and call for less maintenance attention . . . an important factor reckoned in time and money.

And mobilized, too, behind these cars, are the full resources of Fairmont men, methods, and materials . . . to the end that every car, every accessory and every piece of special equipment will measure up to the Fairmont standard of dependability as reflected in the Fairmont 33-year record of PERFORMANCE ON THE JOB.

May we send you comprehensive Bulletin 471 fully illustrating and giving detail specifications of complete Fairmont line? Fairmont Railway Motors, Inc., Fairmont, Minnesota.

32 Series F—A broad utility car for largest standard sections. Carries 8 men and equipment. 8-13 H.P. R Q Roller Bearing Engine furnishes excess power for 1800 lb. load. Bulletin 394.

A3 Series C—A true heavy-duty car with Hercules 4 cyl. 20 H.P. Engine and 4 speed transmission, forward or reverse. Operates from 2 to 27 mph. Ask for Bulletin 403.

Fairmont

RAILWAY MOTOR CARS

Performance ON THE JOB COUNTS

MORE THAN HALF ARE FAIRMONTS

PERIODIC LUBRICATION
PROPER ALIGNMENT
BIG FACTORS IN
IMPACT WRENCH
PERFORMANCE

4 Simple Maintenance steps keep Pneumatic Wrenches on the job

Because of their sturdy construction, slow motor speed and fewer parts (no springs or gears), CP Pneumatic Wrenches (impact type) give long service under severe conditions with a minimum of repairs. But, they will give even better service if they are given a little precautionary care.

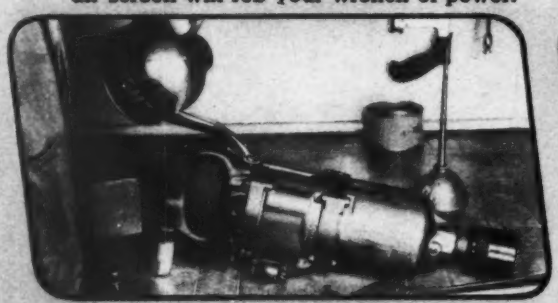
Here are four simple maintenance steps for your CP 365-R Pneumatic Wrenches. Do these things regularly and you will keep your wrenches on the job, cut repair time to the minimum and conserve strategic materials.

While these points apply particularly to the CP 365-R, they are applicable generally to other CP wrenches of the impact type. Detailed suggestions for the care of other models will appear in future advertisements.

HOW TO GET MAXIMUM SERVICE FROM YOUR CP 365-R PNEUMATIC WRENCH

1 Check the air screen at least once a week. Clean it with an air hose. A dusty, dirty air screen will rob your wrench of power.

2 At the beginning of every shift, check the through bolts and nuts on tool housing and motor housing. Be sure all nuts are tight.



3 Proper motor lubrication is essential to good wrench performance. Fill reservoir every day with a good grade of light oil.

4 Once each week, lubricate the 365-RP wrench with a grease gun. For the best results, use the CP Impact Wrench Grease.

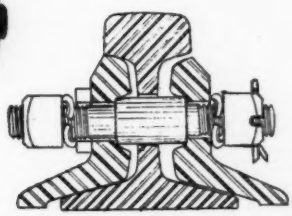
★★★★★★★★★
PNEUMATIC TOOLS
ELECTRIC TOOLS
(Hicycle...Universal)
ROCK DRILLS

CHICAGO PNEUMATIC
TOOL COMPANY
General Offices: 8 East 44th Street, New York, N. Y.

★★★★★★★★★
AIR COMPRESSORS
VACUUM PUMPS
DIESEL ENGINES
AVIATION ACCESSORIES

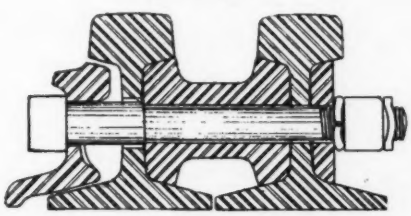
Pettibone Mulliken Shoulder Bolts Eliminate Troublesome Pipe Thimbles

A one-piece unit with a shoulder forged integral with shank



TYPE A

Designed to eliminate weakness and trouble caused by pipe thimbles when used on the bolts at heel joints



TYPE C

• The PMCO Shoulder Bolt is a one-piece unit, with shoulders forged integral with the shank, designed to permit the joint bars to be fully tightened, yet allowing free movement of the point.

Aside from eliminating the weakness and trouble caused by pipe thimbles in heel joints, PMCO shoulder bolts present a definite step ahead in functional design. They are especially desirable at interlockings and spring switches, split switch point derails, movable point crossings, spring frogs or any other point where free joint action is essential.

PMCO shoulder bolts are standard equipment on many of the largest systems in the country.

PETTIBONE MULLIKEN CORPORATION

4710 West Division Street Chicago, Illinois

For Highest Reactive Spring Pressure

VERONA *FIXED TENSION* TRIFLEX SPRING

No spring washer for track bolts should go flat before reaching a practicable and workable bolt tension. Most spring washers do not meet this fundamental requirement.

The Verona ***Fixed Tension*** Triflex Spring provides not only enough free travel to reach adequate bolt tension but also a means of arriving at equal bolt tension in all bolts. Plus, of course, reactive spring pressure more than 250% of A. R. E. A. requirements, to maintain this tension after joint wear.

WOODINGS-VERONA TOOL WORKS

Since 1873

VERONA, PA. CHICAGO, ILL.

Branch Offices Principal Cities

..means better weapons for *Home-Front Soldiers!*

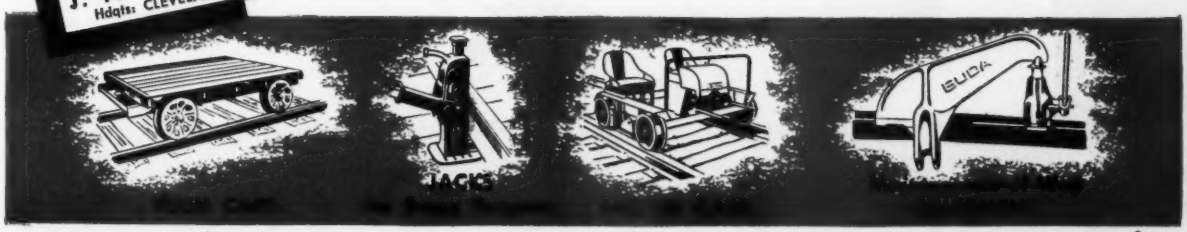
TO serve the railroads of a nation at war, BUDA contributes an array of better tools and equipment to help win the vital battle of transportation.

For example, the job of spiking and tamping ties today is a faster, easier one because of the BUDA Tie Nipper (shown above). This sturdy, simple tool holds the tie firmly against the rail for tamping and spiking the tie—the men formerly needed to pry up the tie are released for other work! With such Buda track tools, regular-sized section crews finish their jobs faster and *get more done.*

For railroad equipment and supplies that match today's urgent needs, look to BUDA!

THE BUDA COMPANY

HARVEY (Chicago Suburb) ILLINOIS



F-M SHEFFIELD AND

A COMPLETE LINE . . . SIZES AND TYPES

FIRST ON THE RAILS . . . AND STILL FIRST

Many changes have taken place in railroading and railroad equipment since the first Sheffield car was introduced to the rails. It was the first of its kind then—and it is still "first," because through the years, the makers of Sheffield Motor Cars have grown with the railroads. Today's Sheffield and Eclipse Motor Cars, like those which have preceded them, are *built by men who know railroading, and for railroad men.*

All SHEFFIELD cars are chain-driven. This type of drive is best where snow, ice, and high water are encountered. The Sheffield clutch can't burn out in operation.

All ECLIPSE cars are belt-driven. In other respects, Eclipse cars closely parallel Sheffield cars in construction and engineering detail.

INSPECTION CARS

WATER-COOLED • AIR-COOLED • CHAIN DRIVE • BELT DRIVE

INSTRUCTION BOOKS *and parts lists on these cars or on any Fairbanks-Morse railroad equipment gladly supplied without cost or obligation, upon request.*

New—Sheffield Model 57. (*Illustrated above*) Fast, lightweight unit, large enough for two to ride, light enough for one to handle. Rear lifting weight, 87 pounds. Clutch and roller chain drive. Rubber cushioned, quiet; no metal to metal contact between wheels and frame. Wood-center wheels for quiet riding and longer life. Steel wheel hubs for greater safety.

9-hp. water-cooled engine with Timken bearings. Send for Bulletin.

Eclipse Model 757. Same as Sheffield **57** except the **757** is belt-driven.

Sheffield Model 54B. (*Illustrated at left*) For one to four men, yet one man can handle it. Rear end lifting weight only 100 pounds. Water-cooled 5- to 8-hp. engine. Chain drive. Ask for Bulletin.

Sheffield Model 84B. Similar to **54** except air-cooled.

Eclipse Model 754B. Similar to **54** except belt-driven.

Eclipse Model 784 B. Similar to **54** except air-cooled and belt-driven.

FAIRBANKS, MORSE & CO.

600 SOUTH MICHIGAN AVENUE, CHICAGO, ILLINOIS

ECLIPSE MOTOR CARS

FOR EVERY NEED

SECTION CARS

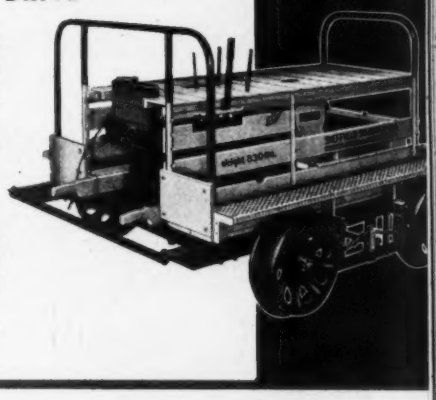
7 MODELS • WATER-COOLED • AIR-COOLED • CHAIN DRIVE • BELT DRIVE

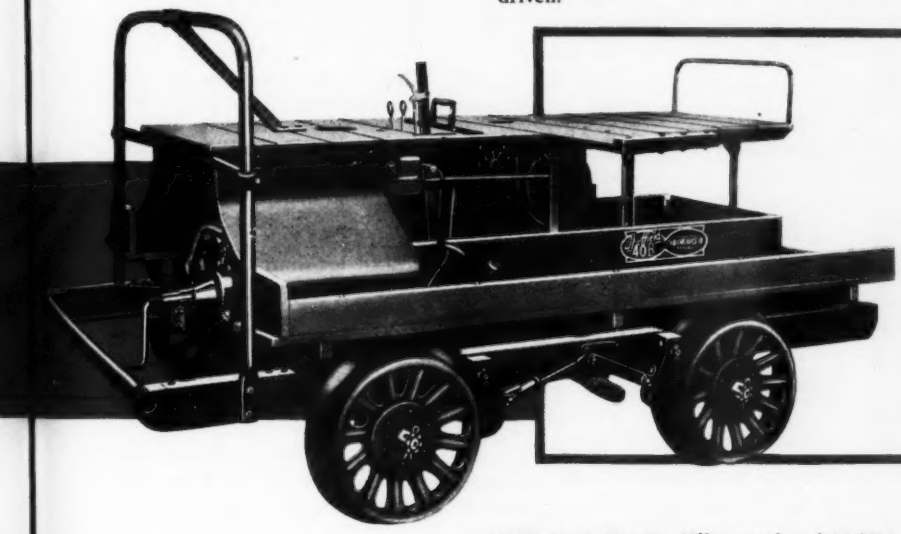
Sheffield Model 85. (*Illustrated at left*) Lightweight, full-sized section car, weight 700 pounds. Has alloy steel frame, safety tread metal toe boards, pipe safety rails, side outlet exhaust, self-centering brakes with cast-iron faced brake shoes, removable seat top. Rear lifting weight only 101 pounds. Air-cooled 8-hp. engine, chain drive.

Eclipse Model 785. Similar to **85,** but belt-driven.

Sheffield Model 58. (*Illustrated at right*) A lightweight section car for a six-man gang and their tools. Weight, only 830 pounds. Rear end lift, only 117 pounds. Water-cooled 5- to 8-hp. engine. Chain drive.

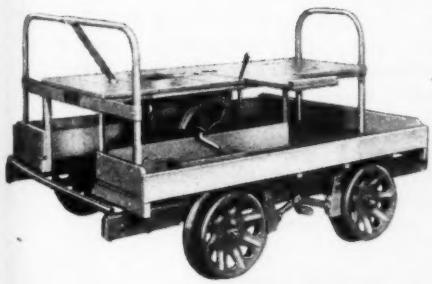
Eclipse Model 758. Similar to **58,** but belt-driven.





EXTRA GANG AND B&B CAR

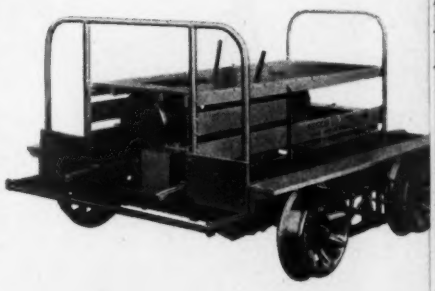
Sheffield Model 408. (*Illustrated*) Two-cylinder, air-cooled engine permits full-load operation for hours without overheating. Develops exceptionally high torque at low speeds. Friction transmission. Chain drive. Steel frame. Write for Bulletin.



Sheffield Model 44B. (*Illustrated at left*) The standard section car on many class 1 railroads. Sturdy, roomy. Weighs 1095 pounds. Has ample power to haul trailers loaded with men and tools or ties. Water-cooled 8- to 13-hp. engine with air-cooled head. Chain drive.

Sheffield Model 53. (*Illustrated at right*) Weighs only 929 pounds, with rear end lift of only 124 pounds. Has 8- to 13-hp. water-cooled engine with air-cooled head. Chain drive. Space for full section gang and tools. Ask for Bulletin.

Eclipse Model 709. Similar to **53** but belt-driven.



RAILROAD SALES OFFICES: NEW YORK • CHICAGO • ST. LOUIS • ST. PAUL
CINCINNATI • ATLANTA • NEW ORLEANS • SAN FRANCISCO

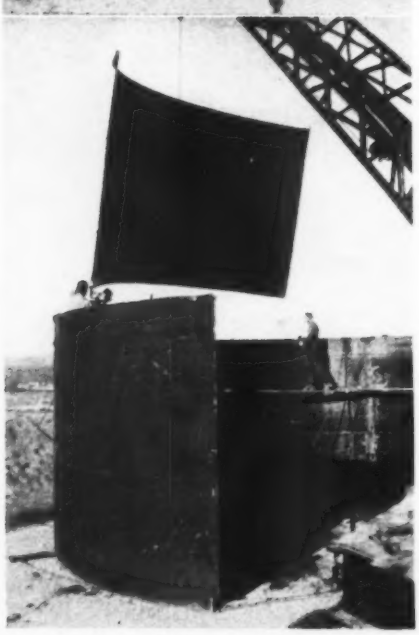
Export Division: 80 Broad Street, New York City

Canada: Canadian Fairbanks-Morse Co., Ltd., Montreal, Toronto, Winnipeg

CONSERVE STEEL WITH TELEWELD Maintenance Service

Tank Being Flame-cut Into Sections

Sections Are Then Loaded Into Gondola Cars and Moved to the New Site.



Re-erecting the Tank

Steel Conservation By Experts

Cutting Down and Re-erecting Steel Tanks, Rebuilding battered rail ends, worn frogs and switch points. Reinforcing steel bridges

TELEWELD, INC., offers to the maintenance official, an unusually comprehensive service to aid in the conservation of steel, through the utilization of the TELEWELD method in the dismantling and re-erection in new locations of water and fuel oil tanks of steel construction.

Briefly, the procedure is as follows:

1. Tanks at original location are flame cut into sections, the lengths of the sections being limited to sizes which will not buckle excessively while being handled from one location to the other, while the width and height of the sections are held to conform to the allowable clearance of the road.
2. The cut sections are then loaded into gondola cars, moved to the new site and re-erected on previously prepared foundations.
3. In re-erecting, the sections are fitted together, faired up in their original positions in the tank and then butt welded together by an approved standard electric welding process. The tank is then thoroughly tested for leakage.

If you will tell us your tank problems, we will be glad to furnish, without any obligation on your part, plans and estimates and show you how you can utilize your present existing facilities to better advantage and save money as well as steel.

TELEWELD
INC.
Welding Engineers & Contractors
Railway Exchange Bldg.
Chicago, Illinois

PROLONG LIFE OF PRESENT And FUTURE CURVE RAILS

Each Meco Lubricator Protects a Number of Curves

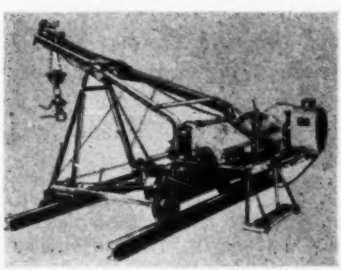
Railroads are planning for Post-War in many ways besides reducing capital investment—including the installation of equipment that will not only conserve materials *now*, but reduce costs for many years. MECO Lubricators fit into this program. They double to quadruple the *remaining life* of curve rails now in track —then stay on the job and keep on prolonging the lives of many generations of new curve rails.

MECO CURVE RAIL LUBRICATORS

1. Minimize curve rail wear otherwise caused by wheel flange friction.
2. Make curve rails last as long as tangent rails.
3. Reduce derailment hazards by decreasing curve friction.
4. Eliminate or reduce regauging and realigning of curves.
5. Greatly reduce respiking of ties on curves, and continual replacement of spike-killed ties.
6. Prevent possibility of train delays due to curve regauging or rail replacement work.
7. Make higher train speeds possible, with safety.
8. Speed up slow trains, thus decreasing "flow" of low rail.
9. Reduce wheel flange wear, particularly noticeable on locomotive wheels.
10. Permit increased tonnage ratings through divisions where curvature governs such ratings.
11. Reduce fuel consumption.
12. Frequently do away with helper service.

Let us Analyze Your Curve Territory Charts and Suggest Economical Lubrication

POWER RAIL LAYER



Requires no train orders.

MACK SWITCH POINT PROTECTORS

Make switch rails last 8 to 10 times longer.

MAINTENANCE EQUIPMENT COMPANY

RAILWAY EXCHANGE BUILDING • CHICAGO, ILLINOIS

Another building is damaged or destroyed by

ROOF COMMUNICATED FIRE!*

SOMEWHERE, right this minute, a burning brand is flying through the air . . . flying toward an inflammable roof. Ten minutes from now that roof will be on fire—a fire that may mean serious loss of property and possible interference with our war effort.

That's why roofs should have the fire protection of asbestos. You can provide this protection for your stations, shops and sheds with a Johns-Manville Asbestos Roof. For a demonstration of the fireproof qualities of J-M Asbestos Roofing, write Johns-Manville at New York, Chicago, Cleveland, St. Louis or San Francisco.

**The National Fire Protection Association has estimated that in 1940 (latest figures available), 62,000 buildings of all types were set afire by sparks falling on inflammable roofs.*

JOHNS-MANVILLE

85 YEARS OF SERVICE TO TRANSPORTATION

AIR POWER and AIR TOOLS PRODUCE

MORE WORK Per Man Hour

With manpower an increasing problem, every consideration must be given to ways and means to utilize available crews and equipment to do an even greater maintenance job. Portable air power and lightweight air tools are a working combination that is helping to solve this problem.

Ingersoll-Rand "off-track" compressors produce the air power. They are readily portable and can operate many combinations of air tools. They do not interrupt the flow of traffic and keep up with the work as it progresses. I-R compressors are noted for their reliability and uninterrupted service on the job.

Ingersoll-Rand lightweight air tools reduce operator fatigue and speed up the work. This produces a better grade of maintenance which is necessary today with the record wear and tear on railway properties.

Ingersoll-Rand

11 Broadway, New York, N. Y.

ORIGINATOR OF MECHANICAL TAMPING

All plants of Ingersoll-Rand Company are flying the Army-Navy "E" awarded "for high achievement in the production of war materials."

The I-R Line

Tie Tamper Compressors
Tie Tampers
Spike Drivers
Track Wrenches
Grinders
Chipping Hammers
"Utility" Air Hoists
Wood Borers
Paving Breakers
Jackhamers
Impact Wrenches
Riveters

11-278

All along the line—

DUFF-NORTON JACKS

A SHORTCUT TO FASTER MAINTENANCE

The Railroad Man's favorite Track Jack—Duff-Norton No. 117.

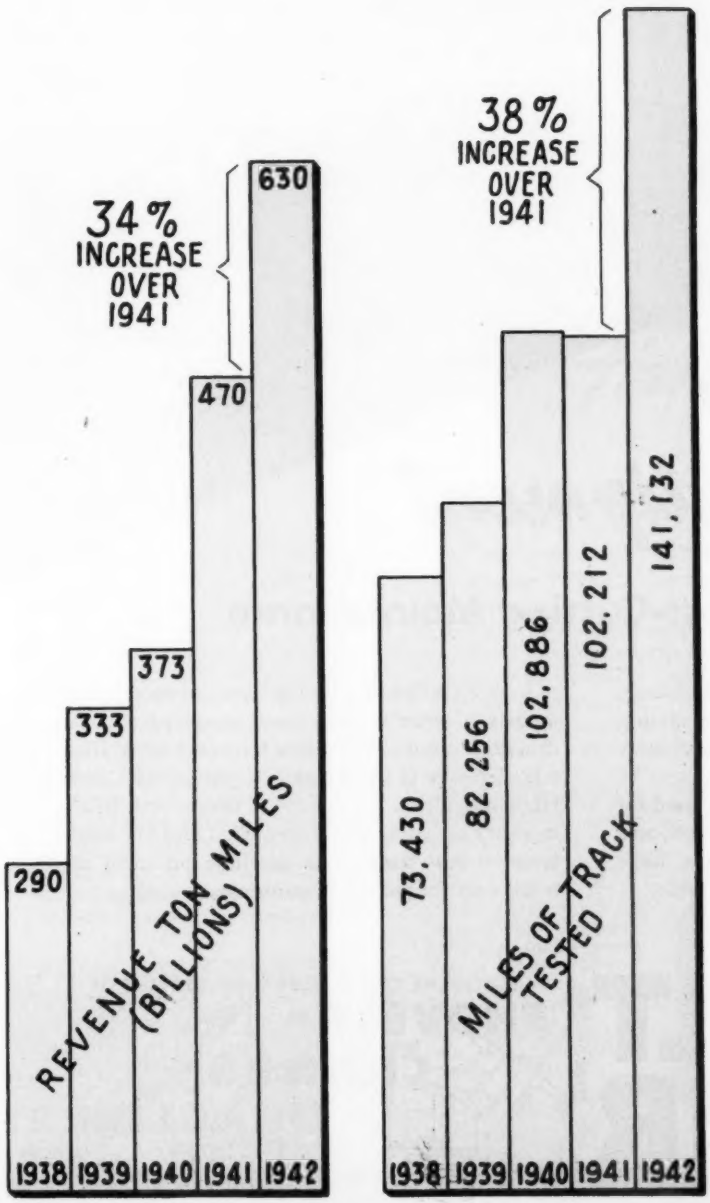
The work goes faster with Duff-Norton Jacks on the job! Easy-to-operate, speedy, dependable, these mechanical muscles stretch your manpower further.

Duff-Norton Jacks are sturdily built to take the toughest kind of war-time service. Make full use of them to speed your track work.

Write for Catalog 201—a handy 56-page data book on the complete line of Duff-Norton Jacks

THE DUFF-NORTON MANUFACTURING COMPANY
PITTSBURGH, PA.
Canadian Plant: COATICOOK, QUE.
DISTRICT REPRESENTATIVES IN PRINCIPAL CITIES

SPERRY RAIL SERVICE for Greater Safety



IN 1943

RAILWAY Tracks (Rails) Carried 34 Per Cent More Ton Miles in 1942 than in 1941. It is Estimated that Traffic Will Increase 11 Per Cent More in 1943.

Increased Traffic Means Increased Wear on Track and More Defective Rails in Track.

Maximum Safety Can be Assured Only by Frequent Testing with Modern Improved Detector Cars.

Sperry Rail Service Tested 38 Per Cent More Track in 1942.

More than 70 Railways Are Now Testing Rails with Sperry Modern Improved Detector Cars.

SPERRY RAIL SERVICE

Hoboken, N. J. Chicago, Ill.

FOLLOW THE TREND TO *Off-Track Equipment*

For Speedy, Effective, Cost-Cutting Maintenance

Performance records of railroad companies throughout the country show tremendous savings on maintenance jobs where "off-track" machinery is being used.

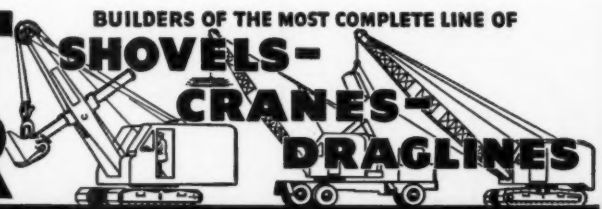
Crawler draglines and shovels are now used for bank-widening, ditching, filling, bridge work, and similar jobs. Truck and crawler cranes have proven most economical and highly versatile.

Link-Belt Speeder builds twenty-one different models of crawler and truck mounted shovels-draglines-cranes—machines for every need. Illustrated above is the rugged ¾-yd. LS-85 Crane. High mobility . . . plenty of power and lifting capacity . . . economical operation and low maintenance cost make this machine an ideal off-track unit for railroad maintenance work.

3040

LINK-BELT SPEEDER

BUILDERS OF THE MOST COMPLETE LINE OF
SHOVELS—CRANES—DRAGLINES



LINK-BELT SPEEDER CORPORATION, 301 W. PERSHING ROAD, CHICAGO, ILL.
(A DIVISION OF LINK-BELT COMPANY)

What Steel Company First Made Hadfields Manganese Steel in America?

Sir Robert A. Hadfield

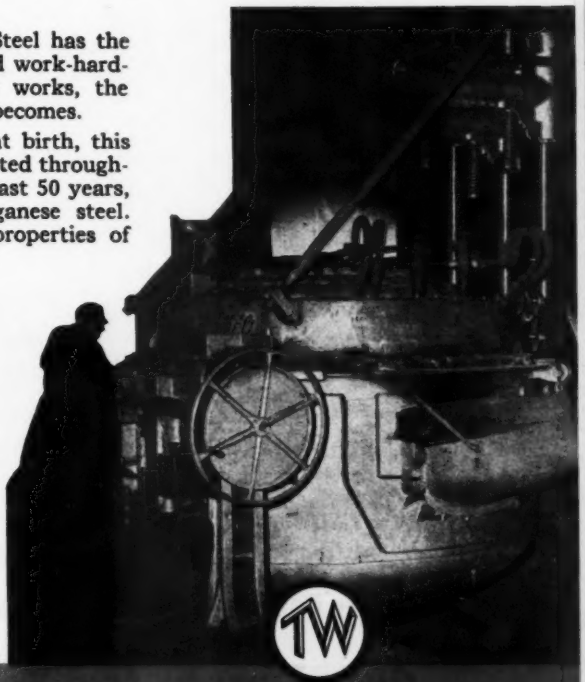
TISCO-*First* in Manganese Steel!

ON October 29, 1892, the first heat of Manganese Steel in America was poured at the High Bridge, N. J. plant of the Taylor Iron & Steel Company (now Taylor-Wharton Iron & Steel Co.) as sole U. S. patent licensee, under the personal direction of Sir Robert A. Hadfield, originator of that remarkable steel.

This great development brought to American industry a steel of unequalled toughness and durability for severe conditions requiring resistance to heavy impact and abrasion. Among its useful applications are railway frogs, crossings and switches —grinding and crushing equipment —power shovels, dredges, etc.

Hadfields Manganese Steel has the unique property of cold work-hardening. The harder it works, the more wear-resistant it becomes.

Christened "TISCO" at birth, this name has become accepted throughout the world for the past 50 years, as the finest of manganese steel. Today, the valuable properties of TISCO Manganese Steel, and the technical skill and modern facilities of our two plants are now serving 100% in this country's war effort.



Shown at top is a 3-ton bottom blow converter used for many years. Right; Modern electric melting furnaces used today.

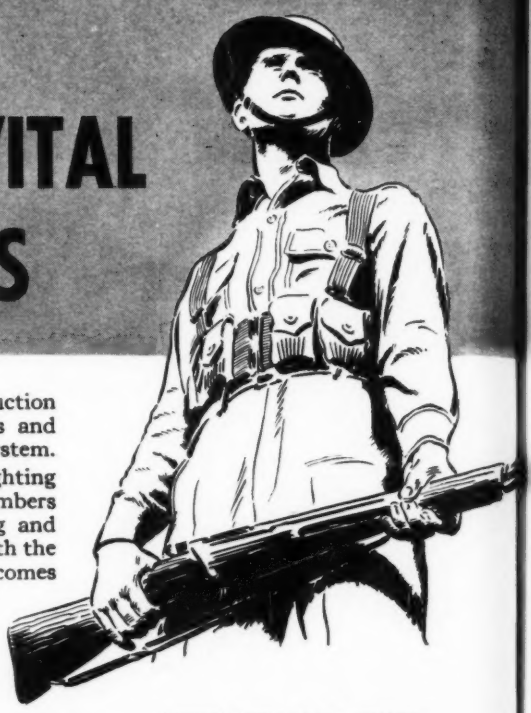
Left: Special shipyard crane switch of TISCO Manganese Steel.

Taylor-Wharton Iron & Steel Co.

HIGH BRIDGE, NEW JERSEY • EASTON, PENNSYLVANIA

GUARD AGAINST SABOTAGE NOW

BY FLOODLIGHTING VITAL TRESTLES and BRIDGES



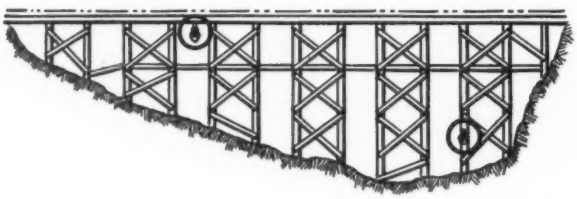
TO KEEP war materials moving, start guarding against destruction now—and do it with light. Saboteurs may slip past guards and barriers but they can't evade a well-planned protective lighting system.

Alert to the needs and requirements, leading railroads and G-E lighting engineers recommend lighting the piers, abutments, and structural timbers instead of the bridge deck. With the ***supports*** lighted, trespassing and malicious destruction of property are definitely discouraged. But with the ***deck*** lighted, the ground or water level is in the shadows, and it becomes necessary to patrol with electric lanterns. Guards carrying lanterns are not only excellent targets, but have limited visibility.

Right in your division, there may be a dozen spots where protective lighting can help keep essential war materials moving. Why not ask a G-E lighting specialist to help you make the best installation for each trestle and bridge? To bring him to your desk just phone the nearest G-E office. Or write ***General Electric, Schenectady, N. Y.***

General Electric and its employees are proud of the Navy award of Excellence made to its Erie Works for the manufacture of naval ordnance.

TRESTLES LESS THAN 40 ft HIGH

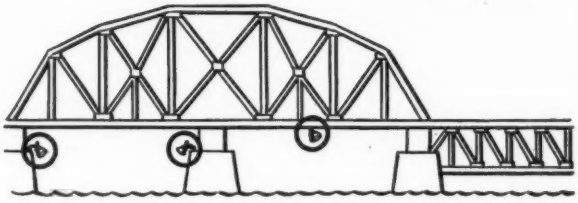


Where trestles are less than 40 feet high, Form 79S street-lighting luminaires suspended from the floor timbers are recommended. Luminaires should be mounted approximately 100 feet apart to prevent shadowy areas and provide acceptable lighting if one lamp should fail. The symmetrical light-distribution pattern illuminates a wide area to either side of the footings. A spring hanger should be mounted between the bracket and luminaire to lessen effect of vibration on the lamp.

TRESTLES MORE THAN 40 ft HIGH

Form 79VR street-lighting luminaires mounted on the outside vertical structural timbers are recommended for higher trestles. Units should be mounted 25 feet high and spaced from 150 to 250 feet apart. The universal-mounting bracket has horizontal and vertical adjustment to compensate for rake and to light a wider approach area. Guards on the bank, screened from the saboteur by the glare of the luminaire, have a clear view parallel to the trestle.

BRIDGES WITH PIERS LESS THAN 100 ft APART



Here narrow- or wide-beam floodlights should be mounted on each pier to throw light on the adjacent pier. The number of units required will depend on the size of the pier and, in general, one watt per square foot of pier area will be sufficient. Some light should spill onto the surrounding water but, if the river is navigable, care should be taken to prevent glare on approaching craft.

BRIDGES WITH PIERS MORE THAN 100 ft APART

These are lighted most economically with narrow- or wide-beam floodlights mounted under the deck plate girder spans. A spring or rubber plate should be mounted between the deck and the floodlight to dampen vibration. Enclosed-type floodlights are recommended for all applications because the door glass protects the reflector interior from penetration of moisture, smoke, and dust.

GENERAL ELECTRIC

451-69-3200

NORDBERG POWER TOOLS

will help solve your labor shortage problem

Because of conditions imposed by war, many roads are confronted with the difficult problem of enlarged maintenance programs in face of an acute labor shortage. Such problems as increased maintenance occasioned by heavy wartime traffic, the necessity of getting track back into service sooner and the lack of man power, can be best solved through the use of Nordberg Power Tools. Whether it is the laying of rail or any of the jobs associated with the maintenance of track, Nordberg machines can be depended upon to do better work, do it faster with less men and at lower expense.

NORDBERG MFG. CO.
MILWAUKEE, WIS.

With Spike Pullers on the job, men ordinarily required for removing spikes with clawbars are released for other rail laying operations.

Machine adzing of ties reduces the number of men required for preparing tie seats, improves quality of work and speeds up the job.

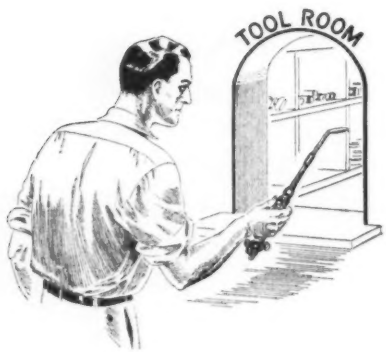
NORDBERG MACHINERY

NORDBERG MFG. CO. MILWAUKEE WISCONSIN

Export Representative—WONHAM Inc.—44 Whitehall St., New York

How To Do

Cylinder Oxygen and Acetylene—Only as much oxygen and acetylene can be supplied as there are cylinders for transportation. Make every effort to reduce reserve stocks and return empties promptly. Protect cylinders from oil and grease and from physical damage. Prevent waste of welding and cutting gases by eliminating leaks in hose and connections and turning off equipment when not in use.



Welding and Cutting Blowpipes – Welding and cutting blowpipes are precision-built of scarce materials and are increasingly hard to replace. Don't use blowpipes as hammers or for any other purpose than that for which they are intended . . . protect metal-to-metal seats from damage . . . clean welding heads and cutting nozzles regularly . . . turn in blowpipes promptly when they are in need of repair.

Carbide—Don't open carbide drums until ready to use the carbide so as to avoid gas loss due to slaking. Carbide drums should be conserved. Open drums carefully so as not to damage them . . . do not punch holes in them. Save all empty drums for return and re-use, first replacing the screw cover and gasket. If not already so marked, drums to be returned to the manufacturer for re-use should be marked with a painted "X" on the bottom.

SINCE 1912—THE COMPLETE OXY-ACETYLENE

The word "Oxweld" is a registered trade-mark.

MORE . . . with Less

Regulators—Fasten cylinders securely in an upright position when they are in use to prevent breakage of regulators due to falling. Blow dirt out of cylinder valves before attaching regulators. Open cylinder valves slowly to avoid a sudden rush of gas into regulators, and release all pressure from regulators when not in use. Replace dust caps and store regulators carefully when not being used.

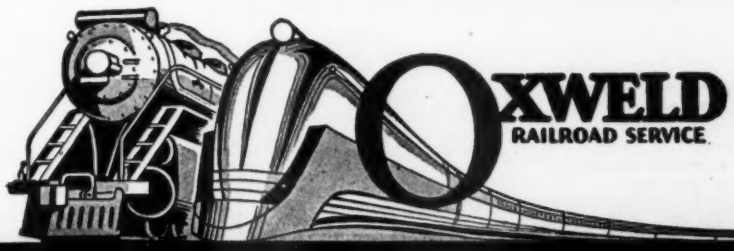
Welding Rod and Hose—Use up stub ends of welding rods by tack-welding them to the ends of new rods . . . don't over-reinforce welds . . . use steel or cast iron rod in place of bronze wherever possible . . . don't spill flux. Protect oxygen and acetylene hose from oil and grease. Don't kink, drag, or otherwise abuse hose. Use short lengths. Repair leaky hose with Oxweld hose splices.

THE OXWELD RAILROAD SERVICE COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

Carbide and Carbon Building Chicago and New York



SERVICE FOR AMERICAN RAILROADS

4 years after packing with RMC PLASTIC

Joint Assemblies are Still 100% Corrosion-free!

PROTECT Steel from Corrosion with RMC PLASTIC

RMC PLASTIC Saves Steel

Now, when both labor and steel are scarce . . . and becoming still scarcer . . . RMC PLASTIC is prolonging the service life of thousands of tons of rail by protecting the most vulnerable spots—the joints—from all corrosive agencies.

RMC PLASTIC Protects

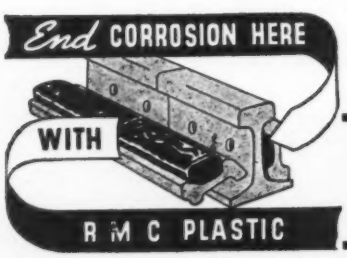
Rail joints, with proper bolt tension, that are thoroughly lubricated can expand and contract properly, so that railend batter is reduced and kinks and humps in track are avoided.

RMC PLASTIC Saves Labor

It prevents joints from freezing by reaching, protecting and thoroughly lubricating every joint fastening and surface.

RMC PLASTIC Costs Little

One simple application of RMC PLASTIC permanently prevents rail joint corrosion and prolongs the service-life of rail, joint bars and fastenings.



You Can Get ALL You Want WHEN You Want It!

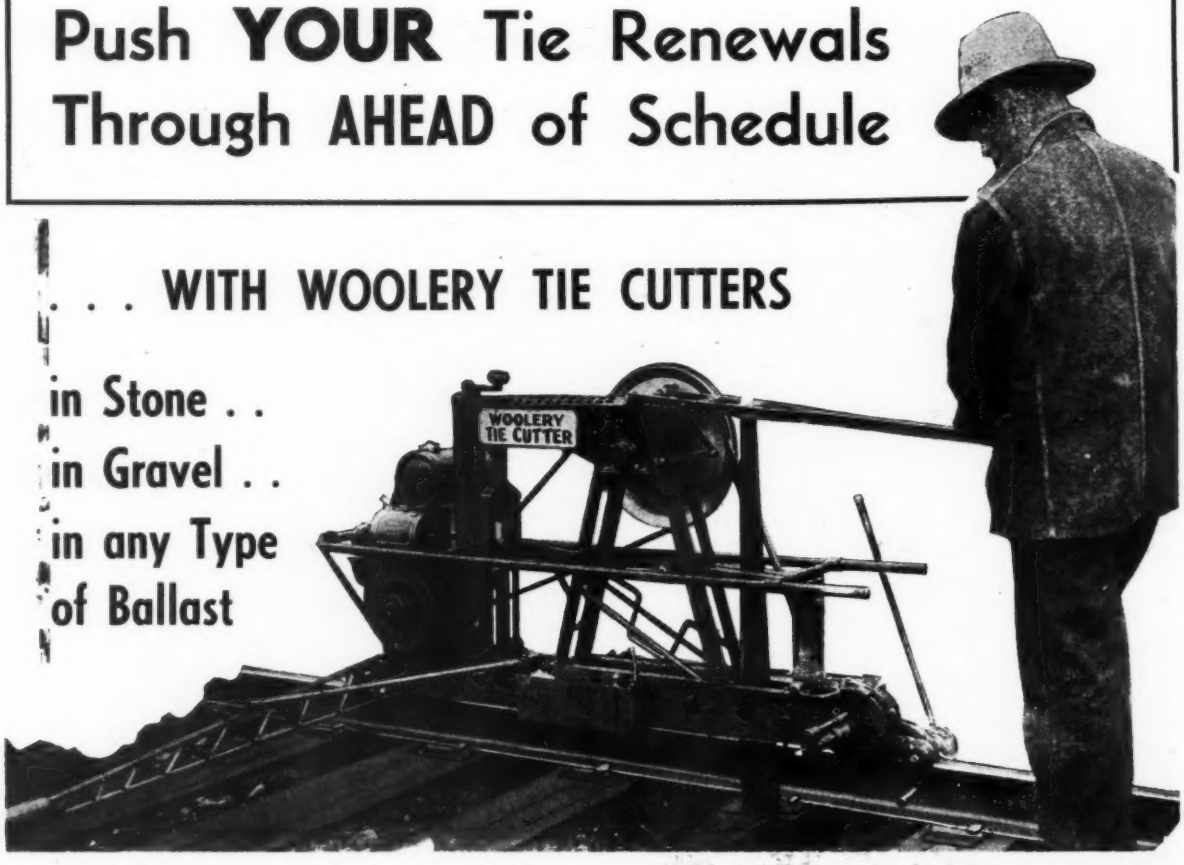
RAILWAY MAINTENANCE CORP.

PITTSBURGH PENNSYLVANIA

Push **YOUR** Tie Renewals Through AHEAD of Schedule

. . . WITH WOOLERY TIE CUTTERS

in Stone . .
in Gravel . .
in any Type
of Ballast



With transportation geared to wartime speed, manpower at a premium and track maintenance work sandwiched in between trains, Woolery Tie Cutters form the logical solution to your tie renewal problem this year.

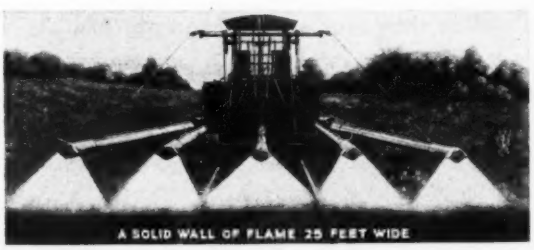
The Woolery Tie Cutter provides a simplified method of removing ties from the track without digging or trenching, or disturbing the ballast. In stone, in gravel, in any type of ballast, the Woolery Tie Cutter quickly saws the tie into three, easily-handled, pieces, which can be lifted (not dug) out of the tie-bed without disturbing the surface.

The Woolery Tie Cutter is built compactly, and its light weight and perfect balance enable one man to set it clear of the track in 10 seconds, an important safety factor in the operation of machines in today's heavy, high-speed traffic.

Write TODAY for full Information about WOOLERY Time and Labor Saving Maintenance Equipment.

INSURE CLEAN TRACK with WOOLERY WEED BURNERS

On more than 60 railroads Woolery Weed Burners are saving money and simplifying track maintenance by providing a speedy, safe and efficient means for weed eradication. Models are available for every track need. 3- and 5-burner types for main line tracks; 2- and 1-burner models for branch lines and yards.



A SOLID WALL OF FLAME 25 FEET WIDE

WOOLERY MACHINE COMPANY

MINNEAPOLIS — Pioneer Manufacturers of — MINNESOTA

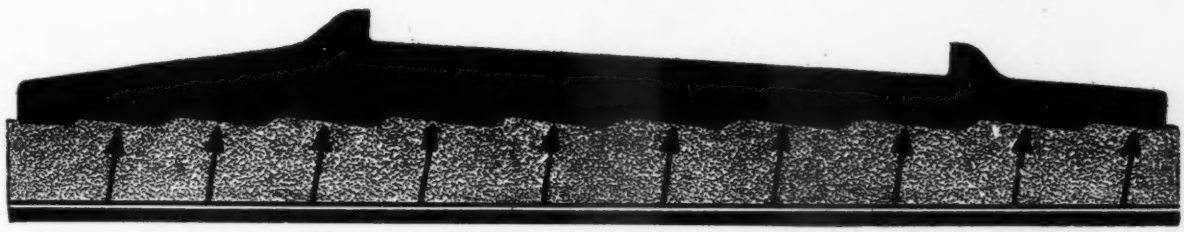
RAILWAY MAINTENANCE EQUIPMENT

TIE CUTTERS • SWITCH HEATERS • MOTOR CARS
RAILWAY WEED BURNERS • BOLT TIGHTENERS

GOOD TRACK MAINTENANCE

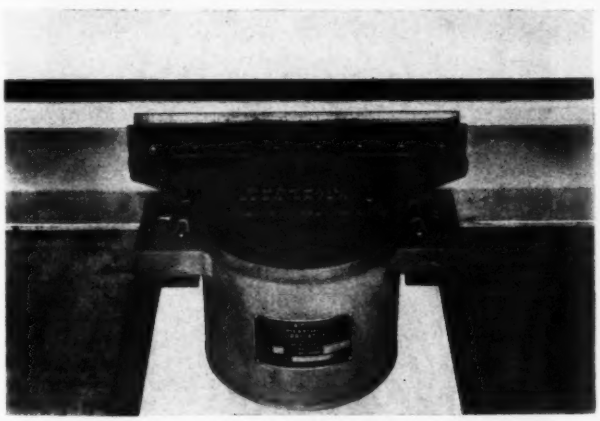
Was Never More Important

IN ALL HISTORY



Lundie Tie Plates and Aladdin Lubricators Conserve Steel

The greatly increased traffic due to the war, demands thorough track maintenance. It is essential that the railroads have more maintenance material if they are to fulfill the task they are called upon to perform.



Aladdin lubricators reduce wear on the rail as much as 30%. It is one of the lowest cost lubricators on the market. The grease is discharged by vibration; ramps and pumps are eliminated.

The Lundie Tie Plate and Aladdin Lubricator conserve critical material and provide better track conditions, enabling the railroads to more efficiently meet the constantly increasing demands for transportation. Due to the economical design of the Lundie Tie Plate 10% less steel is required in their manufacture, and maximum protection to ties and proper bearing for the rail are achieved by the inclined stepped seating.

THE LUNDIE ENGINEERING CORPORATION

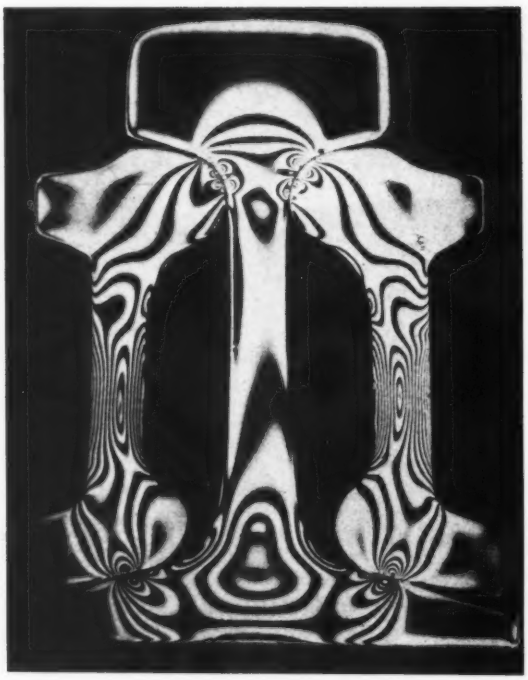
Tie Plates—Spring Rail Clips—Safety Tongs for Handling Track Material—Aladdin Rail and Flange Lubricator

19 WEST 50th ST., NEW YORK

59 E. VAN BUREN ST., CHICAGO

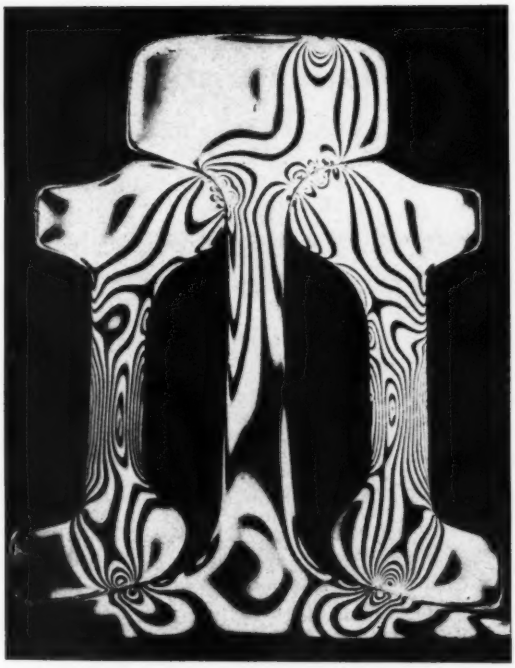
PHOTO-ELASTIC STUDIES OF HEADFREE TOELESS JOINT BARS

No. 1 of a Series of 4



Bolting Strains

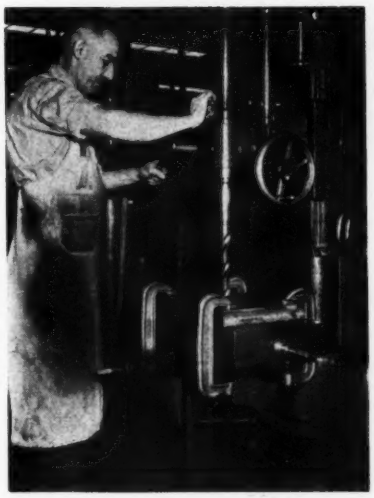
Intensity of Strain is proportional to the number of lines



Bolting and Eccentric Loading Strains

HOW AND WHY

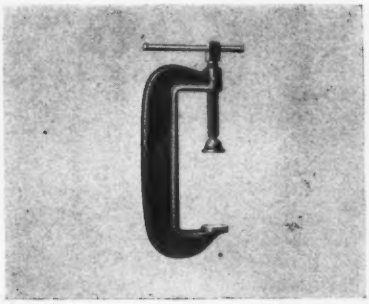
WILLIAMS' TOOLS AID WAR PRODUCTION



With "C" Clamps now widely used in many phases of war industry and construction, information on the various standard types is timely. Williams' Clamps are all drop-forged from selected steel and heat-treated. Screws are made of special steel, hardened and tempered. A description of the various Williams' patterns, for light, medium, heavy and special duty, follows:

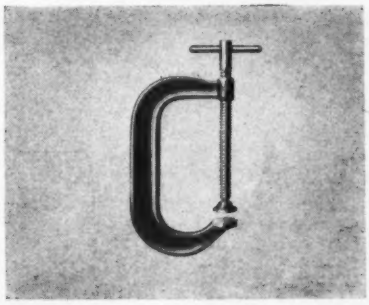
DATA ON WILLIAMS' "C" CLAMPS

WILLIAMS' "AGRIPPA"
for general service



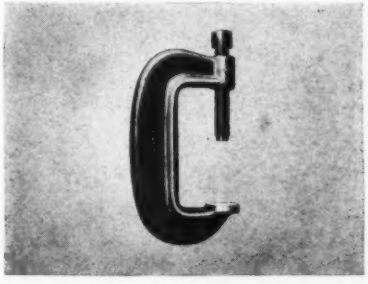
8 sizes, with maximum capacities from 3″ to 18″. Fitted with drop-forged swivel and screws having sliding pin handle, and threaded U. S. Std.

WILLIAMS' "DEEP THROAT"
for light duty and welding



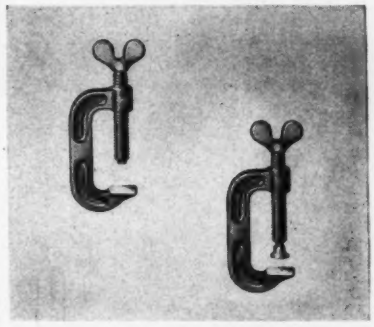
7 sizes, with maximum capacities from 2″ to 12″. Furnished in two finishes: *Standard* for general service; *Spatter-Resisting* for welding, completely cadmium-plated to resist adherence of welding spatter. Screws have special thread for strength and rapid adjustment.

WILLIAMS' "VULCAN"
for heavy service



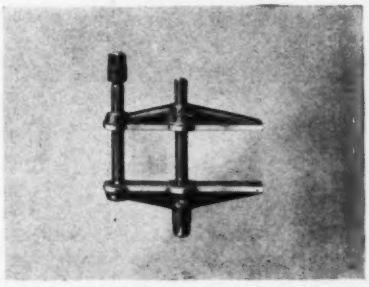
11 sizes, with maximum capacities from 3/4″ to 12-1/2″. Long screws can be furnished providing a minimum capacity of 0. Screws threaded U. S. Std.

WILLIAMS' "VULCAN" TOOL-MAKERS CLAMPS



Furnished in 2 types: with plain and with swivel screw. Each type in 4 sizes, with maximum capacities as follows: plain screw, 1″ to 4-1/4″; swivel screw, 3/4″ to 4″. All screws have wings shaped to permit use of lever in tightening. U.S. Std. thread.

WILLIAMS' "VULCAN" PARALLEL-JAW CLAMP
for Machinists' use



4 sizes, with maximum capacities from 1-1/4″ to 4-1/4″. Screws threaded U. S. Std.

WILLIAMS
SUPREMACY IN DROP FORGED TOOLS
Headquarters for over half a century for DROP-FORGINGS and DROP-FORGED TOOLS

Sold by Leading Industrial Distributors Everywhere . . . J. H. Williams & Co., Buffalo, N. Y.

This *LATEST TYPE TENDER*

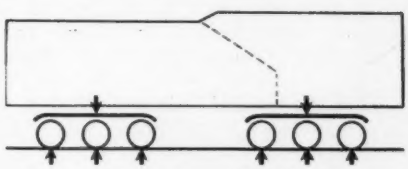
Was Developed to

REDUCE WHEEL LOADS AND TRACK STRESSES

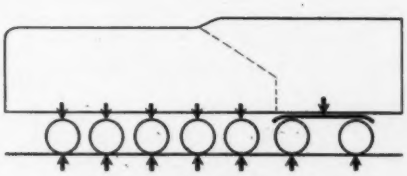
AMONG the important advantages of this latest type tender over the conventional tender design is the fact that lighter loads per wheel are obtained with more uniform distribution of weight at rail—wheel loads and track stresses are reduced.

This design permits greater water and fuel capacity within restricted limits—***weight of tender is reduced*** and increased mileage is obtained between wheel turnings. Operating and maintenance costs are reduced and locomotive availability increased.

LOADING DIAGRAMS



Conventional Design



Latest Type Tender Using Commonwealth Tender Bed

In service or on order for these railroads

UNION PACIFIC	*NORTHERN PACIFIC*
BOSTON & MAINE	*D. & R. G. W.*
D. M. & I. R.	*NEW YORK CENTRAL*

GENERAL STEEL CASTINGS

EDDYSTONE, PA. • GRANITE CITY, ILL.

No. 171 of a Series

Railway
Engineering and Maintenance
SIMMONS-BOARDMAN PUBLISHING CORPORATION
105 WEST ADAMS ST.
CHICAGO, ILL.

Subject: Keeping Up to Date

March 1, 1943

Dear Reader:

In our December issue I wrote you of the scheduled arrival from the press later that month of a new edition of our Railway Engineering and Maintenance Cyclopedia. In the February issue, there appeared an announcement and review of this edition. Through this and other publicity, nearly 2000 copies have already been ordered; only 1500 copies remain. These orders have come singly and in groups up to 145 in number. Some roads are purchasing them for all or selected members of their supervisory staffs. From the ranking officer of one of the roads that took this action, we received a letter a few days ago that aroused our interest by reason of the perception that it revealed of the possibilities for the use of this Cyclopedia. I believe that it will be equally stimulating to you. In substance this letter read as follows:

"As you know, we have ordered more than 100 copies of the Cyclopedia. We plan to place one in the hands of each of our supervisory maintenance officers. In these days of such severe demands on our maintenance forces and in the different but equally trying days that we expect after the war, our men need to know of every new device, every new material, every new method that will aid them in their work. We know of no better source to which we can turn for information of this character than the Cyclopedia. (You will recall that we purchased 120 copies of the last edition.) Our problem is to get our men to take the time, in these days of such extreme pressure, to explore this large volume and find the information that will be of assistance to them. Can you help us develop a solution"?

This is a very intriguing challenge. We have given it a great deal of thought. Our conclusions are not yet thoroughly "jelled" but our thinking to date is in the direction of carefully reviewing the book, paragraph by paragraph and drawing therefrom a large number of pertinent and timely questions relating to today's problems, and separately, the numbers of the pages on which the answers may be found. It is our thought further to prepare those questions and references to answers in printed form and to make them available to all who have already purchased or will purchase the Cyclopedia.

I am wondering how this idea appeals to those of you who have already secured or plan soon to secure copies of the Cyclopedia. I will appreciate your reaction to this plan and your suggestions for its improvement.

Yours sincerely,

Elmer T. Howson

ETH:WB

Editor

P.S. To those of you who have not yet ordered your copies, I suggest early action because I anticipate that the edition will be out of print within 60 days.

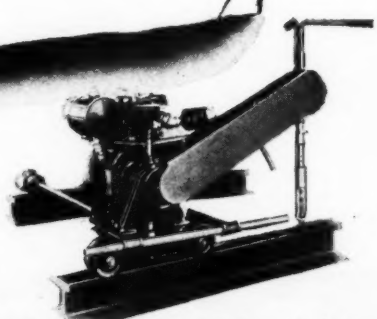
75% of TRACK REGAGING ELIMINATED WITH THE RACO TIE BORER...

HERE'S PROOF! RIGHT FROM THE FIELD

The Raco Tie Borer as employed in rail laying, accomplishes two obvious things:—Halves the number of spike setters required, and eliminates the necessity of realigning tie plates, after spikes are driven, which requires from 5 to 7 men.

"As Mr.....had before him the annual report on rail laying, I asked what he found the Tie Borer accomplished aside from the two savings mentioned above. He said that the two were the least important. The big dividend comes from the fact that the rail 'holds its line'—which it never did before. Requested to elucidate, he said that in 5 to 6 weeks after rail is laid, it is necessary to go over it, fair the line and curves and regage the track. Previously it was exceptional to find three lengths of rail that did not have to be touched, and regaging necessarily was a continuous operation over the newly laid rail. With the Tie Borer in operation 75% of the track does not have to be touched and that, of course, means that 75% of the regaging is eliminated."

Raco Tie Borers, Raco Power Track Machines and the Everett Power M-W Machine will help solve the critical man-power problem and will get the work done quickly and economically.



The Raco Tie Borer weighs only 245 lbs. and can be pushed or pulled along level track with a 5 lb. pressure.

RAILROAD ACCESSORIES CORPORATION

CHRYSLER BUILDING, NEW YORK, N. Y.

Published on the first day of each month by the

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105 West Adams Street, Chicago

NEW YORK
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CLEVELAND
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WASHINGTON, D.C.
1081 National Press Bldg.

SEATTLE
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Subscription price in the United States and Possessions and Canada, 1 year $2, 2 years $3; foreign countries, 1 year $3, 2 years $5. Single copies, 35 cents each. Address H. E. McCandless, Circulation Manager, 30 Church Street, New York, N.Y.

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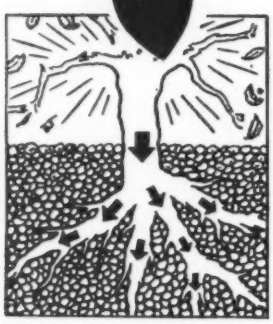
Railway Engineering and Maintenance

NAME REGISTERED U. S. PATENT OFFICE

MARCH, 1943

RAILWAY MEN!···INVESTIGATE New Simplified "BYSULOX*" METHOD To Kill R. R. Weeds!



BYSULOX "BOMBS" WEED ROOTS! Unlike most other weed killers, BYSULOX swiftly penetrates weed growth—then translocates *right down into the roots* like a depth bomb—killing weed roots as it travels within their inner circulatory structure!

NO REVENUE EQUIPMENT NEEDED! The BYSULOX METHOD does *not* require the use of revenue standard equipment. Existing spray equipment or available non-revenue equipment can be used.

A research development of General Chemical Company, BYSULOX is a tried and tested method of weed control! For the first time, it combines the latest in the science of chemical weed killing with a *new, simplified,* low-cost method of application that meet's *today's* conditions.

The efficiency, simplicity and adaptability of BYSULOX to all railroad weed control problems, recommend it as the *best* method yet devised for killing railroad weeds! Railway executives and maintenance officers are cordially invited to write for further information. No obligation of course. Use the coupon *now!*

Air Mail This Coupon Today

A Research Development of
GENERAL CHEMICAL COMPANY
Weed Killer Department
40 Rector Street · · · · New York, N. Y.

*Trade Mark of General Chemical Company

The BYSULOX METHOD Offers These Outstanding Advantages!

1. *Reduces* work train time, cost and equipment.
2. *Eliminates* bulk tank car mixing.
3. *Meets war time conditions.*
4. Quick kill, positive results on all railroad weeds.
5. Improves drainage—prevents fouled ballast.
6. Provides weed-free track—opens track visibility.

GENERAL CHEMICAL COMPANY
Weed Killer Department
40 Rector Street, New York, N. Y.

Gentlemen: I am interested in obtaining information on your new method of weed killing. Please send me further details. I understand there is no obligation.

Name.....

Position.....

Railroad.....

City.....

State..... REM

Railway Engineering and Maintenance

Labor

The No. 1 Problem for 1943

Labor will hold the spotlight among maintenance problems this year. As such, it will supplant materials as the factor limiting the output of maintenance work this season—not because the shortage of critical materials has become any less acute than in 1942 but because labor has become much more scarce. This is a new experience for many men who hold positions of responsibility in railway maintenance today, for one must go back a quarter of a century to the days of World War I to duplicate the acute situation that is now developing so rapidly.

In comparing the conditions that prevailed in 1917-18 with those that exist today, one is struck with the mechanization that has taken place. A quarter century ago few of the units that are common equipment today had yet won acceptance. Thousands of hand cars still carried men to work; the power adzer and the tie tamper were not yet developed, while the power saw and acetylene and electric cutting and welding torches were largely unknown. Such equipment as was in use was cumbersome and designed almost exclusively for large operations.

It was freely said by railroad men in those days that track work and other maintenance tasks did not lend themselves to mechanization. Many outside the industry were outspoken in their criticism of the railways' failure to follow the lead of other industries in bringing power to the assistance of their men and thereby multiplying their efforts. And the attitude of the men themselves was predominantly hostile because they visualized the day when this equipment would take their jobs from them. As a result, the railways secured little relief from machinery when World War I took so many of their men.

A Marked Contrast

Today, maintenance officers face still greater drains on their forces. And the wear and tear of traffic is reaching new heights. Yet, the railways face the situation with one great advantage—the vast mechanization that now prevails. This development has been remarkable in the rate of its growth, in the diversity of its ramifications and in the manner in which managements and men alike have acclaimed it. Rather than throwing men out of work, both have accepted it as a means for doing better and more lasting work with less drudgery and exhaustion.

This growth can best be measured by the fact that the railways have invested more than $120,000,000 for nearly 100,000 power driven units of one kind or another within this quarter century. And the investment shows no signs of slackening, for in the last two calendar years, 1941 and 1942, the railways spent over $20,000,000 for more than 15,000 power-operated units of equipment for maintenance of way operations.

No other industry can point to a more rapid or widespread response to today's trend towards mechanization of its operations. No industry is doing more today to eliminate drudgery among its employees. This development has contributed greatly to the efficiency with which maintenance forces have been able to meet the heavier wheel loads and higher speeds of the last five years. It is standing the railways and their men in particularly good stead in these days. It is a tribute alike to managements and men; it is a tribute also to the ingenuity of those builders who have made these units available. To all these men this 25th Annual Equipment Economies Issue is dedicated.

Accidents—

Increased Rate Presents Challenge

Since the last World War, the railways have made remarkable strides through their constant drive to prevent accidents among passengers and employees. According to the National Safety Council, if fatalities had occurred among railroad employees during 1937-1941 at the same rate that they occurred in 1916 to 1918, 15,020 employees would have been killed instead of the 3,151 who actually died in railway service during the later period. Leading the way in industry in their campaigns to reduce accidents, the trend of fatal and non-fatal accidents among employees on the railways—until recently—has been consistently down. American railway employees have established a world-wide reputation for safety in train operation and in carrying out their routine work that has been unequalled in the history of transportation. Maintaining foremost in their mind their duty to protect life, goods and property, they have taken advantage of the improved facilities provided by the railways and have matched them with better man-performance through the years—*until recently*.

That the above statement must be limited by the qualification—until recently—comes as a shock to every railway man, including every employee in the maintenance of way and structures department, because every one of them is involved. Especially in times such as the present, when every accident, large or small, is detrimental to the war effort of the railways and the country, the reverse in the accident trend presents a challenge to every railway man to see that it shall not continue.

In 1941, a total of 749 employees were killed in railway accidents of all kinds, as compared with 533 in 1940. In the same year, the number of those injured totalled 25,265, as compared with 17,903 in 1940, the percentage increase in employee fatalities and in non-fatal injuries being nearly the same—40.53 per cent and 41.12 per cent.

That maintenance of way and structures employees are directly involved in this matter is seen in the fact that 152 such employees were killed on duty in 1941, compared with 109 in 1940, and this trend will, unquestionably, be evident still more forcefully when the figures of non-fatal accidents among these employees become available. That maintenance employees are involved is seen also in the fact that in 1941 there were 1,145 train accidents due to defects in or improper maintenance of way structures (12.2 per cent of the total), compared with 774 train accidents due to the same causes in 1940 (10.9 per cent of the total). Of the 9,401 train accidents in 1941, more than half were the result of derailments, and of these latter, nearly one-fourth were due to roadway failures. That there should be such a reverse in the trend of accidents on the railways would be cause for concern at any time. That it should occur during a period of national emergency, when the railways and each of their employees are vital to the maximum war effort of the country, is cause for serious concern, if not alarm.

While it is true that there are many factors to which this rise in the accident rate can be attributed, including the generally increased tempo of all railway operations and the expansion in employment with inexperienced men, these factors must not be accepted as excuses, but rather, as a further challenge to hold to the enviable safety record of the past. This will call for constant alert to eliminate unsafe physical conditions in materials, equipment and facilities. In this, railway management can be counted upon to demand full co-operation. It will also call for constant alertness on the part of all supervisory officers and employees. While the tempo of operations cannot be slowed down when the demands on the railways call for greater speed and greater output all along the line, haste must be made safely or its benefits will be lost. More time must be taken and more thought given to the instruction of new employees in safe practices. Carelessness in any respect must not be condoned.

This is a personal responsibility for every maintenance man—to himself, to his fellow workers, to his railroad, and to his country, to see that the unfavorable trend in railway accidents shall not continue in 1943.

An Encouraging Sign—

of Co-operation and a Research Attitude

In recent years, as a result of the locomotive wheel load and counterbalance tests that have been conducted by various railroads and also by the Association of American Railroads, mechanical department men have become more conscious of the effect of their equipment upon the rails and track structure. This consciousness has resulted, in some instances, in refinements in counterbalancing and lighter side rods on high-speed locomotives, with the result that both the track structure and the mechanical equipment benefit from the reduced impact and stresses. A further development along this line which indicates that railway mechanical men and railway equipment manufacturers are now considering track stresses more than formerly is the construction of a locomotive tender of large capacity, described in this issue, which was designed to reduce stresses in the rail.

Such developments are an encouraging indication that railroad men are thinking not only of the problems of their particular department or their particular job, but are considering what is best from the broader point of view of the railroad as a whole. This is in direct contrast to the attitude that was so widespread not so many years ago, and which still exists on some roads today, in which departments are jealous of interference or suggestions from without. This attitude also exists in some cases, within a department with reference to suggestions by employees to their superior officers concerning possible improvements. That such an attitude is nearsighted and not to the best interest of the railroads has been well established by the success of the suggestion systems which have been developed on a number of railroads, notably the Illinois Central.

Developments such as this new locomotive tender are indicative also of another encouraging fact—that many railroad men are becoming research-minded and are questioning long-established practices and designs. Such an attitude promises much for the future of the railroads after the war, when they will be faced with competition from all sides and will need to keep abreast of technological developments in other fields to hold their own.

The railroads are the evolutionary product of years of trial and error research based on service records, and,

while such research is slow but sure, the tempo of modern research is so much faster that competitive agencies may outstrip the railways with newer and more popular developments. To hold their own, railroad men must continue to question practices of long standing. Though such practices have been proven by years of trial, better ones may be possible through modern processes or new materials.

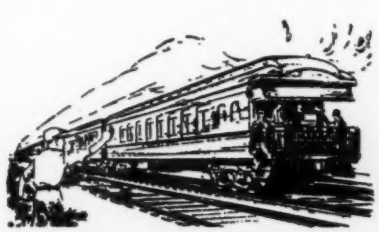
Developments in materials, machines, processes and methods are taking place at an accelerated rate during the war. Most of these developments will not be available to industry for civilian use until after the war. Their impact upon former methods of design, manufacture and transportation will be tremendous. At that time the railroads will need men with a research attitude and a broad outlook who are alert to the opportunities for railroad improvements that these developments will provide.

Work Equipment—

Will the Railways Have Enough?

Faced with shortages in both materials and manpower, and, at the same time, with the largest work program since the late Twenties, maintenance of way forces must turn to work equipment. Recognizing this, they have intensified their equipment overhauling and repair programs to the limit since the close of the last working season, with the result that it is certain that the general condition of the equipment is good. But having made every effort in this regard, many maintenance men are deeply concerned lest, through War Production Board restrictions and the inability of railway supply manufacturers to fill orders, they will be prevented from securing their essential needs in new units. Is there just cause for this concern?

Consideration of this very pertinent question is given in an article elsewhere in this issue entitled "Can The Railways Get Work Equipment?" It seems certain that maintenance men will not get all of the work equipment that they want, or possibly not all that they actually need, but, as brought out in the article referred to, what they will be able to secure will depend in large measure upon themselves. For the defeatist—who "knows" that equipment is not to be had, and makes little effort to find out to the contrary, no matter how great his needs—there will be little or no equipment. On the other hand, for those maintenance men who make known their essential needs early, who can and will back up their requests with facts demonstrating their necessity in the interest of the war effort, and who will follow up their requests persistently, there will be work equipment in the months ahead. In this connection, it is not amiss to point out that, in spite of the gloomy forebodings that were prevalent in some quarters last year as to the ability of the railways to secure their essential needs in work equipment, authorities in Washington authorized and builders delivered a near-record volume of equipment that year.



Deterioration—

Prevent It with Power Machines

ONE cannot fail to be impressed by the similarity of the labor situation with that of a quarter century ago. As it affects the railways, there is the same shortage of man-power, both active and in reserve; there is a similar disparity in wages between the railways and war industries; and there are the same difficulties with respect to the drafting of key men who cannot be replaced easily, and probably not at all for the duration of the war.

Here, however, the similarity stops. Twenty-five years ago the wide range of power machines and tools which maintenance officers now have at their command, was largely unknown. It is true that a few types were in use, but they were both crude and inefficient, compared with those of today. Furthermore, the number of units in use was surprisingly small; so small in fact that it is safe to say that, omitting motor cars, any one of a half-dozen roads today possesses more units of work equipment than the total in railway service 25 years ago.

During the earlier period, since manual operations predominated, when a man dropped out of a gang, if he could not be replaced, and he seldom could, the organization of which he was a part became that much smaller and that much less effective. If he was a man of special skill, the loss in effectiveness may have been still greater. As a result of the critical shortage in labor which developed at that time, the track and structures on not a few roads began to deteriorate noticeably. Fortunately, the situation eased quickly with the end of the war, for if it had continued much longer it would have resulted in the further slowing down of traffic, which was already somewhat disorganized.

This time transportation officers, both on the railways and in the government, have avoided the errors that caused so much confusion and delay in the handling of men and materials during the first World War, and as a result the movement of soldiers and military supplies, although of record-breaking proportions, has been accomplished with few hitches. Maintenance officers are aware of the problems that are confronting them with respect to labor and they are likewise prepared to overcome them if they can obtain the resources with which to do so. They have on hand an impressive array of work equipment, compared with 25 years ago. However, most of this equipment has already been used intensively and much of it now needs replacement.

It will be little short of a disaster if, through lack of the relatively small amount of additional work equipment which the railways should have, the track and other structures deteriorate and thus slow down or interfere in other ways with the movement of war traffic during these critical days when our own troops and those of our allies are depending on the regular and expeditious movement of this traffic. It is to be hoped that the way will be opened for the fulfillment of this important need.

$8,500,000 for

Budgets for 1943 Include the Purchase of More Than 6,000 Units of Work Equipment of 83 Different Types for Maintenance of Way and Structures Work

CONFRONTED with a situation that is more acute than most of them have ever been called upon to face, maintenance officers are unanimous in the belief that the only solution of these problems is a wider and more intensive use of work equipment. For most of them this means the purchase of additional units, as well as better utilization and more careful maintenance of those they now possess.

On first thought, this might seem to be an inopportunie time to discuss further purchases of power machines and power tools, particularly in view of the heavy purchases of work equipment that were made in each of the last two years, and which climaxed several years of liberal buying. Yet the need for this equipment is so urgent that no purpose can be served by evading the question or by ignoring the situation creating this need.

Throughout the last year a shortage of labor has been developing in all branches of railway maintenance, until today it has reached or is approaching the critical stage in practically every section of the country. With substantially no reserve supply to draw on to replace the men who enter military service or who drop out for other reasons, the effects of the shortage are growing more acute day by day. Furthermore, the situation, difficult as it is of itself, is aggravated by the demands that are being made on the maintenance forces by the extraordinary volume of traffic that is now being handled and which are intensified by the pressure for more expeditious movement of this traffic.

No Other Substitute

Maintenance officers have learned by long experience that there is no substitute other than machine-power for man-power in maintenance. They have learned also in the same school that, in many instances, the machines will do better work than it is possible to obtain manually, an example being the tamping of ties. There are other operations that cannot be performed safely by hand, such as the laying of heavy rails. Still other classes of work, if done manually, require so many man-hours for their perform-

Work Equipment in 1943

Confronted with an Acute Shortage of Labor, the Railways Plan to Buy as Many Units as War Restrictions Will Permit

ance that during periods of labor shortage they must be greatly curtailed or left undone, unless machines are available.

On the other hand, given sufficient power machines and power tools, this work can still be performed in such volume and to such standards as will keep railway structures in condition to handle today's record-breaking traffic without delay or interference with military or other war requirements. In fact, this is the only solution of the problems with respect to labor that are now confronting maintenance officers, and it is in recognition of the need for more equipment that they are planning to make purchases again this year comparable with those of the last two years.

Present information indicates that the railways are planning to purchase 5,000 units of work equipment of all types in 1943. However, this figure includes only a few of the small portable, power-operated, hand tools, used principally in bridge and building work, of which an increasing number are being purchased each year. On the basis of the purchases of these types that were made in previous years, it is safe to assume that the budgets for this year carry not less than 1,000 such tools. Adding these to the 5,000 units concerning which information is definite, the total is raised to 6,000 units, which the railways are planning to purchase in 1943, at a cost of $8,500,000.

Budgets Still Large

While the purchases that are in prospect for this year are somewhat less, in both the number of units that it is now planned to buy and the money involved, than were actually bought in either 1942 or 1941, a comparison with previous years shows that the purchases in each of these years were about 50 per cent greater than in 1940, and that those in 1940 were 50 per cent above 1939.

Another reason for the indicated decrease in prospective purchases for this year, compared with actual purchases, was given by more than one maintenance officer, who expressed the fear that they will be unable to obtain the equipment they foresee the need for, because of the severe restrictions that are placed on the use of critical materials. In fact, a number of them said specifically that they have not included in their budgets all of the machines that they feel certain that they will require, because they do not believe that, under the present system of material distribution, they will be able to fill their needs. Others, representing the majority, are more optimistic, for they believe that where the War Production Board understands the situation and realizes its seriousness, the necessary priorities will be released. Furthermore, it must not be overlooked that in normal times actual purchases are always greater than budget estimates, or that today there are unusually strong incentives for purchasing additional units of work equipment.

40 Roads Participate

This forecast is based on information received from 40 roads that were asked what equipment they expect to buy this year. Complete and detailed answers were given by 28 of these roads, representing slightly more than half of the mileage of the United States. Of the remainder, some have not yet completed their budgets; others have prepared no budgets, preferring to make their purchases on a day by day basis as the need arises. Only one road advised that it does not expect to purchase any power machines or power tools during the year. A few roads that foresaw an acute need for such equipment during the season placed orders in 1942 for such units as they anticipated that they would require.

Several officers stated that they had made marked reductions from their original estimates of what they ought to buy, in the belief that the system of priorities in effect will make it impossible to obtain all of the units they

The Amount of Rail Laid Is an Index of Maintenance Activity as a Whole

still insist they are going to need. Some of these officers, and others who have made no such reduction in the number of units they plan to buy, report definitely that their purchases will exceed their present budgets if the allocations of the necessary materials will permit deliveries to be made.

One officer who took the position last year that he could not consistently ask for any kind of work equipment "because to do so might interfere with the war effort," has now changed his point of view and advises today that "we expect to buy all of the work equipment we can get our hands on." These and somewhat similar remarks by others give clear indication that most maintenance officers are alert to the conditions that are confronting them and that they foresee a continued intensification of the labor situation. It can also be deduced from their discussions that they are no longer being called upon to justify the equipment they are recommending and that, ample funds now being available, almost the only question that is now being raised is "what are our neighbors doing?" In other words, "are these recommendations in line with the practices on the lines of neighboring railways.

The Dominant Reason

With few exceptions, from the beginning of the development of power machines and power tools for maintenance operations, economy has been the dominant reason for its purchase and use. Today, while the economy of using power equipment is realized more fully than at any time in the past, this reason for its use is being completely overshadowed by the fact that such depletion of the forces has already taken place, and that these forces will be depleted still further, that the only way that tracks and structures can be maintained safely and satisfactorily is by employing power equipment to overcome the labor shortage.

Railway officers are aware, equally with officers of the army and navy, that despite the fact that combat zones are far distant from our shores, maintenance of the railways of this country to a high standard is as much a military necessity as the production of arms, ammunition and other war supplies. In fact, military operations can be hampered seriously, and perhaps disastrously, by failure to move men and supplies expeditiously and dependably where the need arises. It is for these reasons that maintenance officers feel so much concern over the present and prospective deficiency in labor, and are so desirous of obtaining the power machines that will in large measure offset this deficiency.

Those who recall the conditions that existed during World War I, when labor was all but unobtainable and only a few types of work equipment were available, and these only in restricted numbers, can appreciate more fully than those who did not have this experience, to what extent the maintenance of track and structures must now depend on mechanical aids. They can also visualize the extent to which the track and structures may be expected to deteriorate without these aids and the degree to which the carrying capacity of the railways can be reduced if this deterioration is allowed to take place.

Obviously, the total purchases of work equipment year by year are of both interest and value because they become a measure of the expanding use of this equipment and of the extent to which it is being employed in railway maintenance. However, the value of this information is greatly enhanced if the latest trends in the use of power machines and tools can be traced by means of these purchases. To permit an analysis of these trends to be made, the chief engineers and engineers maintenance of way who were solicited for information concerning their plans, were also requested to give detailed information with respect to the number of units of each type of equipment that they have included in their budgets.

Wide Range of Types

In the replies that were received, 83 types were mentioned specifically, the largest number of types heretofore budgeted, not including many of the small tools used in bridge and building work, which were generally listed as "complete sets of small portable power-operated hand tools for bridge and building work." It is not surprising that the lists, as they were given by individual roads, cover a wide range with respect to both type and size, for an equally wide range of maintenance operations, from heavy grading equipment, locomotive, rail and crawler cranes, tractors and auxiliary attachments, power shovels and draglines, and machines incidental to laying rail, ballasting and renewing ties, to jackhammers, paving breakers, impact and other power wrenches, portable grinders and portable saws.

These 83 individual types include other machines for placing concrete, for maintaining rail, for cleaning ballast, for drainage, for controlling weeds, for maintaining bridges and buildings and for practically all other maintenance operations for which power machines and tools are available. It can be asserted without fear of misstatement, however, that more than these 83 types will be purchased, for it is the invariable experience that even when buying is restricted, as it may be this year by reason of WPB methods of material distribution, the number of types actually purchased eventually greatly exceeds the number included in the budgets. When buying is unrestricted, the number of types purchased may range from 60 to 100 per cent more than were contemplated at the beginning of the year.

Rail Is a Criterion

For many years the amount of rail laid has been a reliable index of maintenance activities as a whole during the year. While no figures have yet been released regarding the tonnage that will be released this year, the railways must of necessity prepare for the amount of rail they expect to get. For this reason, despite the large number of machines that were purchased in 1941 and again in 1942, for laying and caring for new rail, the budgets for this year contain 310 such units, including adzing machines, spike pullers, bolt tighteners, rail cranes, rail drills, bonding drills, spike drivers, rail grinders and other related equipment.

In general, rail programs are accompanied by ballasting programs of corresponding magnitude, and this calls for reshaping and strengthening the roadbed to insure the highest returns on the expenditure for the rail and ballast. But this also calls for a stable roadbed. Obviously, a stable roadbed cannot be maintained without adequate drainage. With the advent of higher train speeds, the need for better and more extensive drainage has been more fully recognized than ever before. This need has been emphasized further by the increasing volume of traffic that the railways are being called on to handle, and by the absolute necessity that nothing shall be left undone to insure dependable and uninterrupted service for military requirements. Information which these officers have given us indicates not only that they are planning a marked increase in the volume of ballast to be applied and in the mileage of track to be ballasted, but that they also plan for a considerable increase in the mileage of track to be surfaced out of face without the application of ballast.

Maintenance officers still recall their experience in clearing the right of way of vegetation after it had been neglected so completely during the depression. Because this experience is still vivid in their minds, and in continuation of the effort they have been exerting to improve the appear-

ance of their properties, but most of all to reduce the hazard of right-of-way fires which might destroy structures and thereby delay or endanger traffic, the budgets for 1943 contain provision for 130 units of weed-destroying equipment, including weed burners, extinguisher cars, mowing machines of various types, discers, scarifiers and weed-spraying equipment. In addition a number of roads are planning to utilize chemical weed killers, if the materials are available.

Need Highway Vehicles

For reasons that are well understood, the proposed purchases of automobiles, motor trucks and highway trailers have been kept to the minimum, although a number of these vehicles have been included in the budgets. This is a sharp reversal of the trend that was so pronounced and which was making such headway when the manufacture and sale of these vehicles were frozen suddenly a little more than a year ago. It is in contrast with the budgets of a year ago, which contained no automobiles and practically no motor trucks or trailers. However, more than one officer has indicated that the need for these vehicles is more acute today than it was when purchases could be made freely, since train service is arranged primarily for moving a vast volume of traffic expeditiously rather than for the convenience of repair gangs, which are thus forced to adopt other means of transportation than trains. Obviously, if there were no restrictions on the purchase of this equipment, the budgets for the year would have contained many units of highway equipment for both routine and emergency movements of men and materials.

In view of the number of trains that are now being operated and of the speeds at which they are being run, it is not surprising that the trend that had its inception about nine years ago, and which has been so pronounced during more recent years, of using off-track equipment for all operations for which it is adapted, will be continued during the year. In addition to the 99 tractors, power shovels, draglines and other units of earth-moving equipment which are included in the budgets for 1943, only 2 of the 32 cranes, other than rail cranes, which it is proposed to buy are expected to have rail mountings, both of these being locomotive cranes.

Even after the movement toward a wider use of off-track mountings for earth-moving equipment became pronounced, crawler mountings were rarely employed for cranes, largely because many of the tasks performed by the machines can be done as well or better from the track, while this type of equipment must often be moved for considerable distances at a moment's notice. Again, not a few of the larger cranes purchased recently have been intended primarily for bridge erection and for other tasks that confine them to the tracks.

Tamping Outfits Smaller

Although the tie tamper was among the earliest of the power machines to be developed, having been in continuous service since about 1916, this type of equipment did not come into the widespread use which its advantages warrant until the last few years. Primarily, the reason for this was that the original conception of this equipment envisioned its use for the large tasks of ballasting and out-of-face surfacing. As a consequence, the power plants were heavy and cumbersome and the transmission of the power was equally cumbersome. With the drastic reductions in force that followed the onset of the depression, there arose an insistent demand for lighter equipment that could be assigned to small gangs. This demand, which became more pressing with the advent of shortened train schedules, resulted in the development of the unit tie tamper, which steadily grew in favor.

Inevitably, competition induced the manufacturers of tie-tamping outfits to simplify their equipment and reduce its weight, until today these outfits of both the pneumatic and electric types are available in sizes suitable for gangs ranging from four men to large ballasting and surfacing gangs. Indicating the wide range of surfacing work that is planned for this year, the railways have budgeted approximately the same amount of tie-tamping equipment as was purchased last year when 332 tie-tamping outfits and 590 unit tampers were bought. This equipment ranges in size from unit tampers to outfits of from 4 to 16 tools.

It has already been explained that anything approaching a close estimate of the number of small, easily-portable, power-operated hand tools to be purchased is not possible, for only a few of the officers who assisted in this survey gave a list of the number of types of these tools that they plan to buy in the same detail as they did of the large units. On the other hand, specific mention was made of rivet busters, riveting hammers, chipping hammers, rotary wire brushes, impact wrenches, other power wrenches, steel drills, wood borers, timber saws, air and electric hoists, winches, clay diggers, concrete breakers, concrete vibrators and portable sheet-pile drivers, aggregating more than 20 types.

It Is Expected That an Unusual Amount of Track Will Be Surfaced During the Year

Portable Tools Gain

However, basing the estimate partly on the information received in response to our inquiry, and partly on the purchases that have been made in each of the last three or four years, compared with the number of units budgeted at the beginning of these years, it is concluded that approximately 1,000 of these portable units will be ordered during the year, if conditions permit their procurement. This conclusion is strengthened by the fact that the budgets contain 88 air compressors and 55 generators, in addition to those that are included in the tie-tamping, welding and electric lighting outfits, which are also in the budgets, this being the largest number of separate power plants ever to be budgeted.

One of the most striking facts connected with work equipment from its inception has been the continued expansion of its use, except during the depression years, and the rapidity of its acceptance during the last six years. One needs to go back only a quarter century to arrive at a time when motor cars, on-rail ditchers,

steam shovels, pile drivers, bridge derricks, locomotive cranes and lidgerwoods were about the only classes of equipment in common use. Some other types, notably tie tampers, were coming into the picture slowly, but had not yet gained much acceptance. Even motor cars were by no means in universal use; in fact, not a few maintenance officers were still skeptical as to their value, and as for the other equipment that was beginning to be developed, most of them considered it wise to reserve judgment on it until it had been proved.

No Longer Skeptical

This attitude on the part of maintenance officers stands in strong contrast with that of today, for they are not only no longer skeptical, but are eager to purchase a wide variety of power machines and tools for almost every class of maintenance work. In this connection, it should not be overlooked that, prior to a quarter century ago, labor had been plentiful and that practically all of the experience of maintenance officers had been with manual operations. To change over to the mechanization of their forces meant a complete revision of the practices with which they were familiar, and it is little wonder that many of them accepted power machines and tools with reluctance. Organizations for the maintenance of such machines as were in use had not yet been built up, and because of lack of experienced operators and repairmen, many of the machines gave much trouble with respect to breaking down, causing irritating delays to important work and loss of time to gangs. Again, few data were available to prove the economy and other advantages of mechanization, and those forward-looking officers who envisioned the advantages of complete mechanization of their forces were severely handicapped by inability to convince managing officers of their need for the equipment they recommended. Furthermore, through lack of experience, errors were committed in the operation and even the allocation of the machines, which reduced their effectiveness and economy, and sometimes made them of doubtful value.

Today, most, if not all, of these disabilities have been eliminated. Executive officers do not need to be convinced of the advantages of power machines and will now approve budgets for work equipment to the limit of the funds available. On the other hand, the situation with respect to labor is also reversed, for in place of an ample supply there is a critical shortage in almost all of the classes of labor required for railway maintenance. For these reasons, and in view of the heavy pressure that is being exerted to maintain the railways to the standards necessary to move expeditiously and safely the vast volume of war traffic that is now being handled, the volume of purchases of power equipment and tools this year will depend largely, if not entirely, on the ability of the manufacturers to make deliveries, a subject that is discussed in another article appearing in this issue.

Shortage Still Exists

Another striking fact in connection with the use of work equipment that cannot be ignored, for it has been strongly in evidence during the last six or seven years, is that despite the heavy purchases of power machines and tools during each of these years, a real shortage of work equipment exists on almost every road today. While this information can be adduced from several sources, the fact that, year by year, almost every budget has contained provision for additional units, and this is more pronounced this year, is strong confirmation of the statement that such a shortage exists.

In previous years this expanding use has been explained by the inexorable pressure for greater economy in all phases of railway operation, for maintenance has borne its share of this pressure. Today, economy, while still desirable and not overlooked, is of secondary importance, for present demands are equally inexorable that the standards of maintenance be kept to a high level, despite the severest shortage of labor that most railway maintenance officers have ever experienced.

If any skepticism has remained with respect to the advantages of mechanization, it has broken down in the face of the foregoing demands and of sheer inability to meet them without recourse to power machines and tools. This is indicated quite clearly by the fact that the discussions which accompanied the details of the budgets as they were given us this year, contained no evidence of self-satisfaction with respect to the equipment now in service or of any tendency to believe that this equipment is ample to meet all needs. On the contrary, more than one officer expressed real concern over the possibility that allocations and priorities might prevent him from obtaining the equipment which he needs so badly. It took many years of evolution in the thinking of both maintenance and managing officers, climaxed by a critical shortage of labor, to enable them to arrive at this stage in which their outlook is so nearly universally favorable to a wider use of work equipment, but having arrived, there is no reason to believe that this viewpoint will be discarded lightly.

One of the obstacles to obtaining the maximum value from work equipment has been inability on the part of many officers to understand the inherent effects of obsolescence and the economic loss that is sustained by reason of it. There is an understandable reason for this, for with an inadequate number of power machines, the tendency has been strong to hang on to the older outmoded units since, if they were in safe condition for operation, some saving could always be effected by substituting them for manual operations, although by comparison with newer models they might be highly uneconomical. During the last three or four years, however, much improvement has been accomplished with respect to obsolescence, for along with the additions that have been made to the work equipment already in use, many of the units that have been purchased have been for the replacement of these older units. This has not always been done because they were obsolete, but because the expense for maintaining them had become unreasonably high; yet the net result has been the same as if they had been retired because of obsolescence, and today the percentage of modern equipment is higher than it has been in many years.

Meeting War Conditions

Ten years ago, at the depth of the depression, the maintenance forces were reduced severely and, despite the fact that traffic had fallen off in corresponding measure, and the further fact that the shortening of train schedules had not yet begun, maintenance officers learned quickly that only through intensive use of the work equipment they then possessed was it possible to maintain their tracks to the standard then in effect. Today new and higher standards of maintenance are necessary to provide for higher train speeds and a traffic of record intensity.

At present, conditions imposed by the war are less favorable than those of ten years ago. Train speeds are far higher, high-speed trains are being run on a large number of roads and traffic is moving in record volume. In contrast, the amount of labor available is already in some sections, and bids fair to be in others, less than what was considered to be rock bottom a decade ago. Yet, the track and structures must be maintained to these higher standards or there can be no assurance that important war traffic

will move safely or expeditiously.

The important question is, what can be done about it? It must be repeated that the only escape from the dilemma created by increased demands for better maintenance and smaller resources of labor with which to meet them, is to make the most intensive use of the work equipment now in the possession of the railways and to purchase the maximum number of additional units that can be obtained under the restrictions imposed by the war. Any other course will invite disaster for the war effort the railways are making so successfully.

Locomotive Tender Designed to Reduce Rail Stresses

AS THE result of the demand, during recent years, for higher speeds and longer runs in locomotive operation with fewer stops for fuel and water, requiring the use of tenders with larger capacities, a new type of locomotive tender has been developed by the General Steel Castings Corporation, Eddystone, Pa., that is designed to reduce rail stresses and thereby rail failures and track damage and also provide increased riding stability with less weight and lower mechanical maintenance costs. The new tender was also designed to provide maximum capacity with a given total fixed wheel base, a factor that is important, since the length of engine stalls and turntables, in many instances, limits the length of tenders, while clearance considerations limit their width and height of existing water and coaling facilities limit their height. Despite these limitations, tender capacities have been increasing.

Heavy loading on small diameter wheels, particularly on large capacity tenders, has been under suspicion for some time as a probable cause of damage to rail. This has led in recent years to the general practice of using wheels 36 in. in diameter, instead of 33 in. in diameter, on large-capacity conventional-type tenders and also to a study of the relation of wheel load and diameter to rail stresses, which has been sponsored by the Association of American Railroads and which has been under way at the University of Illinois since 1941. In these studies, tests have been made with a rolling-load machine with wheels 33 in., 40 in., and 50 in. in diameter, with loads up to 75,000 lb.

Tender Bed Design

To offset the difficulties presented by the demand for large-capacity tenders, the General Steel Castings Corporation has developed tenders with the Commonwealth one-piece water-bottom tender bed. The wheel arrangement of the tenders is similar to a 4-10-0 locomotive. This tender bed permits the use of wheels 42 in. in diameter and provides an unusually stable, easy-riding tender, with a lower center of gravity than conventional tenders with 36-in. wheels. It also permits the elimination of a number of moving and wearing parts.

The first four wheels of this tender are mounted in a four-wheel, one-piece swiveling, laterally-controlled outside bearing truck, which is an adaptation in design of a locomotive leading truck. This truck has a constant resistance, roller-type centering device and does not require side bearings. The remaining five pairs of wheels have equalized spring rigging on each side and the extreme ends of the spring systems are attached to the tender bed through helical springs. This provides the tender with a stable three-point bearing at all times, the other bearing point being the center plate of the front-end swivel truck.

In addition to the constant resistance-centering device on the front truck, the remaining five pairs of wheels have a lateral motion device and rubber-cushioned pedestal liners which provide further lateral motion at each pedestal. These provisions effectively reduce lateral forces on the wheel flanges and rails, decreasing rail and flange wear on curves. They also add to the riding qualities of the tender and make it easy riding at all speeds on both curves and tangents.

With this type of design, as compared to tenders of conventional design, the total light weight for tenders of comparable size is reduced 10,000 to 15,000 lb., and, although 42-in. wheels are used, the center of gravity is lower, adding to the stability. The total weight of a tender loaded with 25,000 gal. of water and 27 tons of coal is about 437,000 lb., and the ratio of load on each wheel in pounds per inch of wheel diameter is 743. For a conventional tender of similar capacity with two eight-wheel trucks, weighing 11,000 lb. more and having 36-in. wheels, the ratio of load on each wheel in pounds per inch of wheel diameter is 777.

Another advantage secured by the tender-bed design is the uniformity in spacing of wheel loads. With the wheels uniformly spaced throughout the length of the tender, a more uniform stress distribution in the rails results, instead of a concentration of load at the trucks with a gap between which causes a large reversal of stress in the rails as the tender passes over. These large reversals of stress are especially undesirable at high speeds.

In brief, the new type of tender permits greater water and fuel capacity within a total fixed wheel base, a material reduction in tender weight, larger diameter wheels with a lower center of gravity, lighter load per inch of wheel diameter and more uniform distribution of weight at the rail. This results in reduced track stresses, better riding conditions at all speeds and substantially reduced operating and maintenance costs. The first of these tenders were built in 1940 for the Union Pacific. Since that time the General Steel Castings Corporation has furnished or has on order 130 tenders with the tender bed construction for seven railroads.

This Tender Has a Capacity of 25,000 Gal. of Water and 27 Tons of Coal

Meeting a Crisis in Labor—With

Presidents of three major railway engineering and maintenance groups tell how this can be done

THESE are difficult days from many angles. In no direction, however, is the outlook more disturbing than with respect to labor. The call to the armed forces, the lure of defense industries and the widespread industrial activity are taking their toll of maintenance forces at a time when the demands of a far heavier and more exacting traffic are increasing the volume and importance of the work to be done. With adequate forces unavailable, recourse must be had to work equipment as a means for multiplying the work that can be done with the men that are available.

Work equipment has won large recognition among maintenance men in recent years, because of its demonstrated merit in increasing the quality of work and in reducing the laborious character of many of the tasks. This year, it is assuming still greater importance as a means for increasing the amount of work that can be done. This recognition is not confined to any one group, executive or supervisory; neither is it confined to any one branch, such as track, bridge or building. On the contrary, it pervades all ranks and all branches of maintenance work. It is uppermost alike in the minds of system and of division officers; it is as pressing in water service as in track work.

Throughout the entire range of maintenance of way activities, men of all ranks are facing the war-time demands of today's traffic with a determination to "keep 'em rolling." The manner in which they are preparing to do this through the more intensive use of work equipment reflects the spirit that has long characterized this branch of railway service—the spirit that accepts a washout or a blizzard as a challenge. This spirit is exemplified by the statements that follow—prepared by spokesmen of three major groups, (a) engineering and maintenance executives, (b) division supervisory track maintenance officers, and (c) division bridge, building and water service supervisory maintenance officers—the presidents respectively of the American Railway Engineering Association, the Roadmasters' and Maintenance of Way Association and the American Railway Bridge & Building Association.

As the Executive Surveys the Problem

By H. R. Clarke*

President
American Railway Engineering Association

THE conditions which the railroads face today and the problems that they must solve are difficult. Traffic, both passenger and freight, is at an all-time high, the demands are more exacting, and the penalty for failure is more severe. Every railroad employee, from president to call boy is determined that there shall be no failure.

In common with all other departments, the engineering and maintenance of way department has its own peculiar headaches. Insufficient labor and hampering limitations on materials are the most important. If given the same consideration in these requests that other, perhaps less essential, war industries are, there would be no question as to what the result would be. Our responsibility is to provide and maintain the fixed properties, the tracks and structures, to carry the business of the nation safely and without delay. Regardless of the handicaps imposed and what we may think might be done to help us, we must do the job. To do it we must conserve labor and material and use both to the best possible advantage.

One powerful aid in supplementing the labor available is work equipment. Unfortunately that too is not easy to obtain and judgment must be exercised in reaching a decision in regard to the units which should be purchased. Only those most necessary and of greatest value should be considered, as large amounts of critical and scarce material are used in building equipment.

Under normal conditions, in order to justify cost of purchase and expense of operation, work equipment must do one of four things:

(1) Perform a given task more economically than it can be done otherwise.
(2) Do the job better than it can be done otherwise.
(3) Do essential work which otherwise could not be done.
(4) Do work for which labor is not available but which can be done with proper equipment.

Ordinarily, if a machine fulfills one of these requirements, it would generally be used, and if it accomplishes two or more its universal use is almost certain.

For the last two decades the purchase and use of work equipment has generally been justified on the ground that it enabled the railroads to save

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Work Equipment

The Former and Now Generally Accepted Methods of Laying Rail Afford a Good Example of How Labor Can Be Conserved in Many Maintenance Operations Through the Use of Work Equipment

money, either in the first cost of the operation or in making possible more permanent work, although of course in some of the heavier work such as driving piles, handling heavy units or moving large quantities of material, etc., such work could not be done without heavy equipment. However, during the last year, due to the pressure of the war effort, the picture has changed radically. We are now confronted with a shortage of men and an increased volume of work, with the result that we are no longer faced with the question of how much the work will cost, but of how we are going to get it done at all for any reasonable amount of money. For this reason, we can justify the purchase and use of power tools and equipment on the ground that with such equipment we can complete work which would otherwise have to be left undone. In the absence of enough men, the question of whether the work could be done for less money by manual means becomes purely academic.

As a guide, or at least a help in planning, we are influenced by past experience. The nearest approach to present conditions, at least in recent years, was during and immediately after World War I. The introduction of power equipment for maintenance of way operations received its first great impetus at that time, when the situation with regard to labor and to some extent to material was nearly parallel with that which confronts the maintenance of way officer today. However, it is only to that extent that there is any similarity between the conditions then and now.

Have Come a Long Way

In the first place the development and promotion of maintenance of way power tools and equipment were in their infancy in 1917-1918. Only a very limited number of types of machines were then being offered for sale. A few of them had advanced through the early stages of development but in the main, the equipment offered was still experimental. Management in general, and even many maintenance of way officers had not yet been convinced of the advantages and economies to be realized from the mechanization of maintenance of way operations. Very little data were available on which to base any justification for the use of such equipment and the chances are that if the facts had been known, little economy could have been shown for many of the machines then being offered.

Because of the intensive development which has taken place since that time, it is certain that few of the junior officers in charge of track or bridge and building maintenance have any conception of the primitive nature of the developments in power tools in these days and of how few of them were used. On most railroads the use even of power tampers was considered a luxury to be enjoyed only by the wealthy, and the tampers were cumbersome and not very efficient. Off-track equipment had not been thought of. The use of the automobile or even the truck as a railroad utility was very much of a novelty. At that time ownership of automobiles by the "common man" was just in its inception.

The users of power equipment in those days were faced with many other obstacles. Few men were trained in the use of power tools; no efforts had been made to recruit young men of mechanical bent for the operation or maintenance of power equipment and, as a matter of fact, the use of the automobile was so limited that experience in the operation of a gasoline engine was by no means as wide then as it is now. The railroads also lacked the experience which would enable them to realize the need for the complete revision of gang organizations involved in mechanization. No administrative procedure had been set up for the distribution of work equipment over the system. The railways had no organization or facilities for the repair and overhauling of their power machinery.

However, in spite of all these disadvantages, the situation which confronted the railroads during the first world war had its bright side in one respect. Once the approval of the management had been secured for the purchase of a machine, there was usually little difficulty in obtaining prompt delivery. It is true that the terms "priority" and "allocation" which beset us in these days are but resurrections of a terminology that had its origin in the earlier war, but many difficulties that confronted the railroads at that time in the purchase of rail, track accessories and work equipment pale by comparison with what we confront today. Whereas the problem in 1917 was to convince our managements that we should modernize our operations, in 1943 we must not only show these managements that the equipment recommended will result in a saving in money, but we must also convince the War Production Board that our requirements for mechanization are vital necessities. Today it is not what we want, but what we can get and when.

One of the chief difficulties which besets us today, not only in obtaining our requirements for materials but also our needs for equipment, is the element of time. We are faced with long delays in obtaining authority for purchases and further delays in getting deliveries. Another factor is the influence of critical materials on the availability of various types of equipment. It should be clear, therefore, that these considerations should exert a marked influence on our decision as to what we should try to get and also on the timing of our budget requests to insure that the delivery of the appliances will coincide as nearly as possible with the beginning of the season during which they will be of greatest use.

Maximum Mechanization

As previously stated, the justification for the purchase of power tools and hand equipment is now on an entirely different basis than it was even as recently as a year ago. There is so much work which must be done that getting the job done as contrasted with leaving it undone should be justification enough because with the present labor shortage it is certain that we must resort to maximum mechanization. There is the added argument also that the deferring of obviously necessary upkeep is out of the question today. We are not only short of labor; shortage of materials is equally important, which means that here again the ordinary principles of economy no longer apply since we must resort to continued upkeep of many items of the track structure beyond the limits of economy for the simple reason that we cannot obtain the materials for renewals that in ordinary times could be justified on the basis of economy; beyond this is the fact that rail transportation is absolutely essential to the war effort.

Regardless of all the reasons that we can marshal for the purchase of power equipment, the fact remains that we will be unable to get everything that we need. This means that we must get the maximum work out of the power tools and machines that are now at our disposal. We must keep up our organizations for the maintenance and repair of these machines and insure that they are overhauled during slack seasons. We must take steps to provide adequate stocks of repair parts, and above all, our plans for the scheduling and distribution of machines should be thoroughly worked out to insure minimum idleness during the active season.

From the Roadmasters' Point of View

By E. L. Banion*

President
The Roadmasters' and Maintenance of Way Association

IN these troubled days, when track materials are becoming increasingly difficult to secure and the labor necessary for ordinary track work increasingly scarce, an added burden has been placed on all maintenance of way officers. The roadmaster and supervisor in direct charge of track maintenance are likewise faced with added responsibility for devising new methods and new practices to meet these deficiencies in an all-out effort to maintain the tracks to high standards at all times.

Rapid progress has been made in improving track maintenance since the trying years of last decade, but full recovery has not yet been accomplished and improvements in track maintenance have not kept pace with the increased speeds and heavier equipment. It is recognized that traffic must be kept moving at the accelerated schedules now in effect; therefore the tracks must be maintained to the highest degree of perfection that it is possible to attain. Not only is it necessary to cope with the ordinary maintenance problems, but expanding industrial activities necessary to the prosecution of the war effort have created many new construction and maintenance problems which have heretofore been unknown.

Our dwindling forces must meet the new demands by streamlined mechanized methods that will produce more work with less man power. Not only must a full day's work be expected and secured from the present work equipment, but new machines and new machine methods must be provided to meet each new demand arising out of the unparalleled increase in the volume of traffic which must be handled.

Many Considerations

In the selection of work equipment to meet the needs of the roadmaster of today, there are a number of requirements to be kept in mind; (1) to improve the standards of maintenance with less man hours; (2) to increase production with less man power; (3) to minimize delays to traffic; and (4) to release for revenue service equipment and power that are suitable for that use.

The roadmaster's problems, like soft track, are always present; however the following problems are of more than usual interest at this time; (a) Increasing the life of rail, switches, frogs and their fastenings; (b) Improving rail-end maintenance and thereby reducing joint bar wear; (c) Mechanical methods to enable the surface of track to be improved with small gangs; (d) Methods for prolonging the life of ties; (e) Improvement in methods for making spot renewals of crossties; (f) Increased use of off-track machinery to avoid interference with traffic and interuptions to the work in hand.

In developing a plan to increase the service life of switches, frogs, and guard rails and their parts, it is necessary to differentiate between the conditions that exist in yards and those in main tracks. This is brought about by the use of gas and electric welding in reconditioning materials, that may

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set up undue stress in certain metals. The advisability of using frogs and switch points that have been reconditioned is questionable in high speed main tracks, while such reconditioned parts are well suited for secondary lines or yard tracks.

In yard tracks a system for building up worn parts by welding and subsequent smoothing of the work by grinding will provide a satisfactory solution for the ravages of wear that bring about frequent replacements in certain track and switch work. Such repairs must, of course, be undertaken

A Machine Such as This Will Relieve An Army of Men For Other Work

before the wear is allowed to progress too far if the best work is to be secured.

In building up frogs by gas welding, wedging or other means should be employed to insure that the applied heat will not cause the frog to buckle in cooling. On almost any welding work it is necessary to smooth up the roughened welds by grinding, particularly surfaces over which car wheels travel. Where it is impractical to build up worn parts because of the stresses produced in certain metals by the applied heat, it is frequently possible to prolong the life of the affected part by grinding and smoothing up the area of unequal wear, removing flowed metal or burrs, smoothing up blunt switch points and other similar procedure. In the protection of switch points in yard tracks against excessive wear, the practice of housing the switch point by double knuckling of the stock rail is preferable to milling out the rail head to provide such protection.

It is recommended that a portable electric welding outfit be employed to make field repairs to manganese frogs, crossings and other such work that can be done in main track under traffic. This will show marked economy in the maintenance of, and will insure periodic repairs to, a stock of material that is becoming scarce.

Rail End Maintenance

In the improvement of rail-end maintenance, there are several factors to consider, which depend on the volume and class of traffic handled, and the age of the rail and fastenings. Of first importance in reducing wear and corrosion of the joint bars and rail ends is a periodic cleaning and greasing of the area under the joint bars. The grease should be of a texture and composition that will retain its lubricating qualities from one treatment to the next, and will also retain its lubricating values even after the lighter oils are volatilized by the heat of summer. Poor lubrication under the joint bars and failure to control expansion movement are responsible for the greater part of the troubles of rail-end maintenance.

Where severe corrosion of rail and fastenings arises from brine dripping or other causes, considerable economy can be effected by treating the rail, tie plates and joint bars with a heavy oil applied by a special self-propelled oiler car that is capable of covering considerable mileage daily.

The life of both rail and joint bars on double track can be increased by reversing the bars and applying rail head shims or other effective means to compensate for the wear. On single track where the wear will justify the application, the use of new or over-filled bars of proper design is good practice. On such work the job is not considered complete unless the chipped rail ends are built up by welding, and after the joint has been properly greased and made tight, the remaining high-low ends are ground to a uniform elevation and all joints then slot-ground to remove any flowed metal fins at the ends in the expansion opening.

Machines Overcome Lost Manpower

In the use of work equipment to overcome the loss of men in the regular section gangs, small portable compressors to operate spot tampers, spike drivers, wrenches, drills, and similar tools will increase the efficiency of the gang, will provide a more uniform class of work than is possible with hand methods, and will likewise make unnecessary the skill required in hand work, which can be acquired only by experience. Most of the work equipment can be adapted to the use of the smaller gangs, and since it will be necessary to depend on the regular section gangs to perform a large part of the maintenance work, this year it is desirable to utilize every unit of equipment that will compensate for the depletion of this force.

The collection, sorting and reclamation of second hand materials and scrap released in repairs and replacements and accumulating from other departments, constitutes a source of revenue, and at this time is also doing much to return badly needed second hand material to additional duty. To facilitate the recovery of this scrap and second hand serviceable material, the collection and disposal should be made as easy as possible and at regular intervals. These collections can be made from the scrap bins at section headquarters with a magnet crane or other suitable loading device, handled in work or local train service on specified collection dates, the scrap and serviceable materials so recovered being forwarded to a central salvage station for sorting and classification.

In large relayer rail projects, the collection of the material released entails considerable expense and owing to its weight there is considerable hazard of personal injury by hand methods. Clean-up work of this kind should be done ahead of any follow-up surfacing program, using one or two light cranes with or without magnets, in work train service, to pick up the second hand material. This method will not only show considerable economy but will release a number of men for other duties.

Extend Tie Life

While there is no actual shortage of tie timber, there is a shortage of men to get the ties out of the woods. Consequently, it is necessary to conserve the available tie supply by increasing the serviceability of those on hand. It would appear desirable, therefore, to use every means to keep the present ties in service as long as possible.

Gage rods, braces, special plates and other devices that will prevent the "spike killing" of ties, particularly on sharp curves and turnouts, should be used. Better adzing and seating of the plates in rail replacement will reduce minimum mechanical wear and damage to the ties. The application of creosote and other wood preservatives will retard and prevent decay. And finally, close scrutiny of each individual tie that is selected for renewal will add to tie life.

In extra-gang work, or where large gangs are used, modern mechanized equipment should be standard practise. Practically every operation in laying rail, from the removal of the old bolts and spikes to the installa-

tion of the new bolts and spikes, can and should be machine work. It has been charged that there is small economy in such mechanized gangs; however, much depends on the organization and the equipment used, and most important of all, the governing factor now, as always, should be the superior quality of the work, with the added necessity at this time of releasing men to other work that must still be performed by the methods of yesterday.

The need for off-track work equipment is greater today than ever before, the principal reason being to release locomotives, cars, and other equipment for revenue service. Further, the use of off-track equipment will eliminate much of the time lost in clearing trains and other delays while getting to and from the work.

In a mechanized rail laying organization, there is a need for a crawler rail crane with a side-mounted boom to replace the on-track type. Such a crane, with crawler compressors and other equipment that can be removed from the track easily, should provide an organization that is independent of men from other departments. Such an organization should not only show low operating costs, but will release men and equipment needed for other work, and, when working under traffic, will result in minimum delays clearing for trains.

To insure full utilization of crawler equipment in track and roadway work, each machine should be adapted to work in close quarters, being of narrow width and of minimum height.

In restoring embankment shoulders, cleaning out surface and track ditches, widening cuts, and drainage work of all kinds, a wide range of off-track earth-moving equipment is available to choose from, much of which is easily adapted to the roadmasters' use.

To secure the increased use of improved designs in roadway tools and work equipment is the roadmasters' best answer to the most pressing problems that confront him today.

As Bridge and Building Men See It

By Geo. S. Crites*

President
American Railway Bridge and Building Association

THIS war is one of transportation and the railroads are the backbone of transportation within our country. If this backbone cracks, our war efforts will suffer partial paralysis. The bridge and building departments are supporting vertebrae of the railroad structure and failure on their part would cause dire results. Bridge and building men have the necessary ingenuity, resourcefulness and courage to meet their responsibilities in the face of shortages of materials and labor. They must plan their work to so use the power equipment that is available to them as to overcome all possible shortages in manpower.

First things must come first, but regardless of this, every hour of labor and every pound of material must be used most effectively. This is where planning for the best use of power machines becomes of vital importance. Such materials as are available—substitute materials may have to do—must be assembled and gotten to the job with the least demands on motive power, cars and men. In congested terminals and on many sections of road this can be done best with highway trucks. These trucks should be equipped with suitable hoisting devices and with a generator set to run power tools. Often such equipment can take along the men and materials needed to do a job, and while there do the hoisting and supply the power. If properly programmed and planned, jobs that otherwise would take days may take only hours. Electric communication and pipe line companies utilize such equipment as they have no rails to run over. Now that railroad rails are "hot," bridge and building men should use every reasonable means to obstruct them as little as possible. There will be locations which off-rail equipment cannot reach, and to such locations men and materials must, of necessity, be moved by rail to do needed work. Super-programming and planning are needed in such cases. All materials and equipment that fit the job and fit the available working force must be assembled and put into such condition that there will be no delays while working. Generally, for an extensive job such as the heavy repair or renewal of a large or long structure, materials should be so loaded that they can be released in such a way as to require minimum sorting at the site of the work.

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Study Needed

Careful study must be made of the work equipment that is available and can best expedite the work. If pile driving is required, the driver, or its tender, should be equipped with a power plant that will operate the necessary tools. An electric generating plant may be of advantage as it can furnish light as well as power. With suitable lighting, it may be found that night work can save time and labor. It is easier to handle electric wires than it is to handle air hose for considerable distances or in tight places. The weight of the conductor is quite a factor where overhead work is involved.

If on-rail pile driver equipment is to be used, provision must be made for it to clear busy rails to avoid interruption to traffic and to cause minimum loss of gang time from work. This directs attention to the utility of off-rail equipment, which is, at times, found to save both time and labor. A crawler-type crane can be loaded on cars with the material and outfit and unloaded on the site of the job to do the unloading and handling of the heavier materials. Where the site is over water, or is otherwise inaccessible to crawlers, on-rail equipment must, of course, be used.

Line of Road Equipment

Line of road equipment, under present conditions, probably will have to be limited to the power that is available. Generally, air power is available, or, in an emergency, may be made available by connecting an air-brake pump to a steam plant. However, there are still available compact electric power units with flexible shaft or wire transmission for operating small adzers, tool grinders, circular saws, wire brushes, concrete vibrators and surfaces, chipping machines, drills and reamers.

An economical and one of the greatest labor-saving tools is a power chain saw. This tool can be powered independently by a small gasoline engine mounted on the saw, or by air or electricity. It requires a proper sharpening device to sharpen the saw

(Continued on page 215)

Large as Steel Production Has Been, It Promises to Become Still Larger During the Present Year

Railway Supply Manufacturers Are Busier Than Ever Before in History, But They Have Not Forgotten the Needs of the Railways for Their Products

Can The Railways Get Work Equipment?

Indications are that the manufacturers and the WPB will cooperate—but that much depends upon railway men themselves

WITH considered thought of the heavy demands that will be made upon them in the season that is opening, and fully mindful of the difficult materials and production situations over the country, the maintenance of way and structures forces of the railways desire to purchase approximately 6,000 units of work equipment in 1943, involving an estimated expenditure of about $8,500,000. This compares with the 7,600 units that they purchased in 1942 at a cost of approximately $10,270,000, and the peak purchases of 8,000 units of equipment in 1941, at a total cost of approximately $10,500,000. That the planned purchases in 1943, a year which promises the heaviest work programs since 1929, and serious shortages in maintenance labor in many parts of the country, are smaller than the purchases of the last two years, indicates unmistakably the determination of the maintenance forces, in the light of material scarcity and war demands on the production capacity of manufacturers to get along with less equipment than they would purchase under more favorable conditions.

Can Builders Supply Equipment?

But having reduced their requirements for equipment far below what they would like to have if it were readily available, the railways desire to learn if they can secure the equipment that they need from the builders. Will the manufacturers be able to meet their requirements? To secure the answer to this question, inquiry was made of a number of representative manufacturers, and the replies, tempered only by the generally expressed desire on the part of all of them to do their share in meeting the demands being made upon them by the armed forces and essential war industries, were highly solicitous of the railway's needs and generally optimistic as to the ability of the builders to fulfill them. But it was evident at the outset that the answer to this question could not be found by inquiring of the manufacturers alone. Neither can it be supplied alone by the manufacturers and those authorities in Washington who control the allocation and distribution of materials. The answer, in large measure, as pointed out by

many equipment manufacturers, will be determined on each American railway—and to a vital extent, by the officer personnel of its maintenance of way and structures departments, down to and including foremen.

In fact, the question whether the manufacturers can meet the needs of the railways for work equipment in the months ahead depends less upon the manufacturers themselves than upon any of the other parties involved. What they can supply depends almost entirely upon their production capacity and upon the extent to which they have been called upon or will be required to produce in war goods or in peace-time products for use by war industries and the armed forces. Beyond this, what they can produce for the railways depends upon the materials that they can secure for this purpose, and this, in turn, depends entirely upon the allocations or preference ratings that the railways can get from the War Production Board for the equipment that they need. Thus, in the last analysis, whether the manufacturers can supply the work equipment desired by the maintenance of way and structures forces depends largely upon those forces themselves. This is true because, to a very large extent, the allocations and priorities that will be allowed for maintenance work equipment will depend largely upon the measures taken by the maintenance of way and structures forces to reduce their needs; upon the early anticipation and statement of their requirements; and upon the ability of these forces to demonstrate that their requests are at an irreducible minimum and in the direct interest of the war effort.

Materials at Premium

With the country engaged in an all-out machine war on world-wide fronts, calling for materials, equipment and supplies, in many cases far beyond its natural resources and the capacity of its vast industrial plant to produce them, it is evident at the outset that everyone cannot have all that he desires in the months ahead. Shortages were first to appear in steel, copper, aluminum and alloys of these metals, as well as rubber, and the over-all demand for these materials still far outstrips the supply. In spite of vast conversions in and the expansion of industry to meet the war needs of the country and, through lend-lease, the needs of our Allies in arms, there are still serious shortages in all of these materials, and in equipment fabricated from them. Furthermore, as our military demands increase with expanded forces and a growing field of military operations, these shortages, in spite of other considerations ,are not likely to become less severe. The Army and Navy are today dissatisfied with their allotments and will continue to clamor for more. Our Allies are dissatisfied and want more. More steel and other basic metals are needed for ship building, for the construction of synthetic rubber plants, and for other industries vital to the war effort, and it can be certain that there will be no let-up in these demands until our enemies in Europe and Asia begin to crack.

It is in the face of such a situation that the railways seek their essential requirements in work equipment for the adequate maintenance of their tracks and structures to carry the huge war load that has been placed upon them—requirements that are doubly essential because of the drain on their manpower by the armed forces and war industries, creating serious shortages in their ranks. What are the chances of their securing their essential requirements under these conditions?

Will Railways Get Requirements?

As must be said of the Army, the Navy, the Maritime Commission, Lend-lease and many vital war industries, none of whom will get all of the materials and equipment that they want in 1943; neither will the railways get all of the work equipment that they want in the months ahead. In fact, still refused a war industry status, in spite of their indispensibility to the success of the war effort, the best that the railways can expect in work equipment involving critical materials, is their essential requirements. More than that, it is growing increasingly evident that without adequate proof of essentiality, backed up by insistence upon the fulfillment of their needs, they will be confronted with difficulty in securing even their essential requirements. What these requirements are, only the railways themselves know. They may involve the total 6,000 units that they desire to purchase, and even that number may have to be expanded to meet new and pressing demands. But, with others pressing their claims for many of the critical materials entering into work equipment with seemingly irrefutable arguments, it is evident that the railways will not get more than they ask for, and may get less unless, weighed in the balance by the WPB, their claims of essentiality equal or exceed those of competitors for the critical materials that are available.

Can the manufacturers supply even that railway equipment for which priorities are obtained? The answer to this question from their specific standpoint lies largely in two considerations, as already pointed out—the extent of their war business and the availability of adequate materials. As is well known, some manufacturers upon whom the railways have relied for certain classes of equipment have become virtual ordnance plants for the Army, Navy and Lend-Lease. Many have expanded their production capacity through extensions to their plants, re-tooling and more intensive operations. That they have been doing a splendid job for the country in this regard is recognized on every hand, many of them having been awarded the coveted Army and Navy E "for high achievement in the production of war equipment."

Supply Companies Are Loyal

At the same time, the railway supply manufacturers have not forgotten the needs of the railways. With the knowledge of the importance of the railways to the war effort, and of their specific maintenance problems, second only to railway maintenance men themselves, practically all of them have reserved some capacity to meet railway needs—in some cases making strong representations to those who would insist upon taking their entire output. As further evidence of this loyalty to the railways, most equipment supply manufacturers are actively soliciting railway business and are in a position to accept orders and make deliveries. This statement is based primarily upon the replies of 24 companies questioned in this regard, only 5 of which stated that other pressing demands upon their plant capacity will not now allow them to solicit railway orders. Even in the case of two of those companies booked to capacity with war orders for months ahead, making the filling of railway orders impossible, it is pointed out that they are actively keeping alive their railway contacts, both to aid the railways in the most effective use of their equipment already on hand, and to assure them that they look forward to the day when they can fill their requirements promptly and in full.

That railway supply companies are still loyal to the railways and are ready to accept their orders does not imply necessarily that they can fill orders out of stock or without some delay in deliveries. With WPB limitation and restraint orders restricting their inventories seriously,

often to the extent of the requirements of orders on hand, only a few companies today can make spot deliveries of other than the simplest equipment if it involves critical materials. Some of them still have equipment on hand for immediate release, but most of them, burdened with war orders and a backlog of railway orders, can accept additional railway orders only with delivery dates extended from two to five or six times normal, and then only with adequate priority ratings.

From everywhere among railway supply manufacturers comes the admonition that to secure more favorable consideration, railway orders must be accompanied by sufficiently high priority ratings. Without such ratings, the manufacturers cannot secure the necessary materials to fill railway orders, nor can they proceed with the building of equipment for the railways from materials on hand, so long as they have government orders with higher priorities. Thus, without sufficiently high ratings, railway orders are sidetracked and are run around by new government orders.

Second only to the need for securing adequately high priority ratings for their equipment, railway supply manufacturers call upon the railways to anticipate their requirements early and to place their orders at the earliest possible date. Among orders with equal priority ratings, it is the first received that get first consideration. Furthermore, knowing the demands, the suppliers can better lay in the materials called for and can lay out more efficient production schedules, both of which are in the interest of the railways in making possible earlier manufacture and delivery of their requirements.

Accept Standard Designs

Another important way in which the railways can help themselves in securing necessary equipment from manufacturers is through the acceptance of standard models, eliminating special requirements as to materials and features of design. Many believe that such standardization of materials and designs would prove to the interest of the railways under even normal conditions, and point out that in times such as the present, it is absolutely essential. In fact, by limitation orders on manufacturers, many of them are definitely restricted to the production of certain types and designs. Others, recognizing the hopelessness of trying to meet refinements in or deviations from generally accepted standard designs, have imposed arbitrary restrictions upon themselves, and accept orders only for their standard equipment in the specific models under production. Failure on their part to do this, they point out, creates bottlenecks in production, utilizes a disproportionate amount of labor, and reacts to the disadvantage generally of all purchasers.

Still another way in which the railways can aid in securing the equipment that they must have is to accept in this equipment adequate substitutes for critical items of materials. On every hand, in the interest of meeting the essential requirements of the railways, manufacturers have developed and adopted substitutes for critical materials that are no longer available, many of them completely redesigning parts and entire units to make the use of these substitutes possible. While some of these substitutes are recognized as inferior to those materials and designs used previously, it is not without significance that many of them represent a distinct advance and are being adopted as standard designs.

Educated to the advantages of the newer, stronger and lighter materials developed during the last decade and applied widely to railway work equipment in the interest of minimum weight and improved appearance, it is understandably difficult for railway men to accept substitutes with which they are not familiar that appear to be a step backward. However, with freeze orders covering most of these light, high-strength materials, and war production requirements taking most of what is not actually frozen, it is imperative that the railways accept adequate substitutes if they are to get certain items of equipment at all. In fact, in order that the manufacturers can meet their needs, it is incumbent upon railway men to work in closest harmony with the manufacturers to the end that still further adequate substitutes are developed and adopted for the duration.

Will Conditions Improve?

Will conditions improve for the railways in their ability to secure work equipment in the coming months of the year? Many railway and railway supply manufacturers do not think that they will—that they will remain about the same. A few predict even more serious conditions. On the other hand, there are both railway and railway supply men who see some relief ahead, and in support of their belief, there are certain favorable indications. In the first place, substantial increases in steel production over 1942 are promised in 1943, which will add materially to the available supply. New war plant construction is largely at an end, which will ease the demand for structural shapes. Manufacturers over the country, heretofore in the throes of expansion and adjustments, are now settling down to greater efficiency in production, increasing their capacity.

In addition to the foregoing, much of the inequitable and otherwise faulty distribution of materials inherent in the days of the Office of Production Management and in the early days of War Production Board control is being ironed out, and under the Controlled Materials Plan, which will be placed in full operation by mid-summer, conditions should become still better, assuring the railroads a fair share of the available critical materials and a simplified procedure in obtaining that to which they are entitled. Furthermore, with a more equitable and favorable system of distribution, insuring the receipt of their needs, the vast inventories built up by many industries, as well as the Army and the Navy, will be reduced and not replaced, freeing large quantities of materials for constructive use.

Added to these is the fact that there is a constantly growing appreciation among the authorities in Washington of the vital importance of the railways to the war effort. As never before, they realize that, with inadequate, undermaintained railways, the whole stream of war production would be slowed down, if not seriously crippled. Within the WPB itself, the requests of the railways for their requirements are in the hands of capable men with a broad knowledge of railway problems and a sympathetic attitude toward their needs. Many of these men, with previous railway experience, feel the needs of the railways as keenly as railway men themselves, and, with a major share in the responsibility to see that the railways, through lack of materials, do not fail to meet the war demands being made upon them, can be counted upon to treat them as generously as the over-all supply of materials and the needs of other essential interests will allow.

The fact that the Office of Defense Transportation has now become a claimant agency in the War Production Board's Controlled Materials Plan, with representation on the Requirements Committee of the Board, along with the Army, the Navy, the Office of Rubber Director, the Food Administrator and certain other primary interests, and can present the

(Continued on page 215)

WORK EQUIPMENT— Are We "Expending"

By G. R. Westcott

Assistant Engineer,
Missouri Pacific, St. Louis, Mo.

THE railways have made an enviable record in handling the heaviest traffic in history. Continued success in this undertaking, however, makes it necessary that track, roadbed, and structures be maintained to the highest possible standards. In doing this, mechanical equipment must play an important part. To a large extent, present-day traffic has made it difficult or, in some cases, impossible to use on-track equipment. For this reason we are concerned here mainly with roadway machines, rather than with work equipment in the restricted sense of equipment mounted on A.A.R. trucks. However, the suggestions made will, in most cases, apply to either type.

Use Was Expanding

Under the peace-time conditions just preceding the war, the use of work equipment, especially small machines and off-track units, was expanding rapidly. While labor was still plentiful, it was becoming more expensive and in some cases less effective, so that the use of power equipment offered a means for obtaining a high grade of maintenance at a more reasonable cost.

The problems of using mechanical equipment, while new, were not particularly difficult. Purchases of new equipment were limited only by the availability of funds, and these were usually forthcoming if reasonable savings could be shown. The work to be done could be balanced nicely against the capabilities of different machines available, and that one could be chosen which offered the best results in use. Repairs could be obtained or made promptly. Capable men could be secured readily as operators. These problems of using the machines seemed so simple that many of us, including both men engaged in using the equipment and those directing its use, failed sometimes to appreciate the costs involved, with the result that we were often wasteful in its use, and so got from it neither the value that we might have secured nor that which we thought we were getting.

War has forced an entirely different set of conditions upon us. Purchases of new equipment are now subject to the scrutiny of government agencies to determine whether the materials involved will lend greater aid to the war effort if used in the machine or if diverted to some other purpose. While we do not always agree with the decisions on this point, we must abide by them and we may or may not get the machines we want.

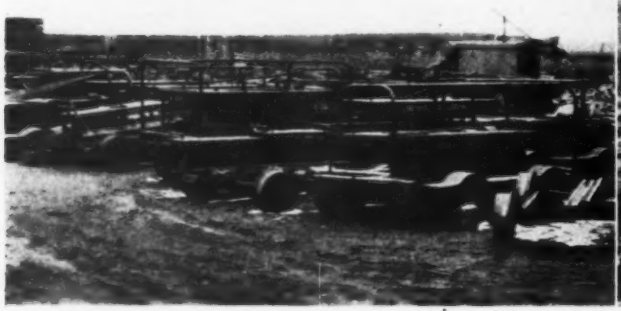
Some Types Restricted

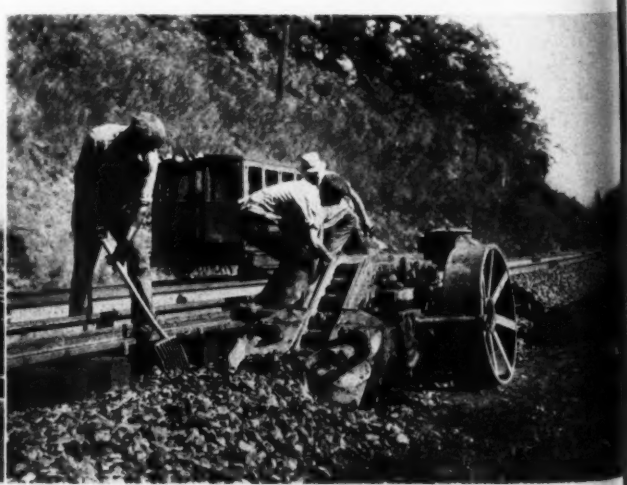
Even if the authority to purchase is granted, we are no longer able in all cases to select the particular machine that will, in our judgment, offer the greatest advantages in use. For simplicity in maintenance, we may have in the past restricted our purchases to a certain make of machine, believing that particular make served our needs best or at the least cost. If, however, the manufacturer of that machine is now engaged largely or wholly in the production of distinctly war materials, his machine may not be available and another make, if any, must be taken.

While up to the present, we have usually been able to obtain parts for the machines we have, for reasons that are well known, the delivery of the parts is often very much delayed.

It Is Better to Maintain Machines in Good Running Condition Than to Await a Breakdown Before Making Repairs

Remember "That an Idle Machine Brings no Return"





It Wisely?

Every unit of work equipment has a definite potential service life and service value as it comes from the builder. In this paper, which was presented before the Maintenance of Way Club of Chicago, at its January meeting, Mr. Westcott asserted that we must use the machines wisely if we are to realize this life and this value fully. He described practices that will insure a full return and called attention to other practices that shorten the life and depreciate the values of work equipment prematurely

Unless the need for the parts has been foreseen, and orders have been placed accordingly, the delay in delivery may mean days or weeks out of service.

Labor Getting Scarce

Many of our capable operators have gone to war, some have left for better-paid jobs in war plants and others have thought it a favorable time to transfer to some other branch of railway service. Yet the need for the machines has increased daily. The volume and speed of present-day traffic are more destructive to track and roadbed than any we have ever known before. Delay to traffic through failure of track or structures does not now mean only that some expense to the railroad and some inconvenience to a shipper whose good will we would keep, are involved, but may mean failure to supply our armed forces with things needed for carrying on the war.

Nor can we return to hand labor. The competition between railways is no longer in the securing of business to handle, but in the securing of labor for handling the business we have. In this situation, each road must compete not only with other roads but also with war industries which can offer much more attractive wages and working conditions than can be found on the railways, and which can, therefore, select the better workmen. Thus labor for railway maintenance has become more difficult to obtain and much less effective, increasing the burden that our machines must carry.

A recent book by William L. White recounts the exploits of Torpedo Boat Squadron Three in the Philippines at the time of the Pearl Harbor attack. Lieutenant Bulkeley was in command on the squadron and it was from him that Mr. White got the rather unusual title of the book—They Were Expendable. "You see," said Lieutenant Bulkeley, "we were expendable," and then explained: "In a war, anything can be expendable—money, gasoline, equipment or men. Suppose you are ordered to hold a position until you are killed or captured; the precious minutes you can hold up the enemy's advance are worth a gun and a man. You're expendable." How and to what extent Lieutenant Bulkley's six light torpedo boats, their equipment and supplies, and the dozen men in each were expended in the action around Manila Bay in the next few

Below—Frequently Equipment Can Be Used in a Variety of Other Work During the Off-Season. Right—Part of a Large Work Equipment Repair Shop

weeks is Mr. White's story. Here we only note that anything is expendable —even the lives of men, if the end sought is important enough and the return secured is great enough.

Machines Are Expendable

Our machines are expendable; they always have been. In past years, the return sought was financial; in this war time, the aim is of far greater importance. We must now look at them not as our own, but as a part of our country's resources entrusted to us; their use is a part of the war effort. We are for the moment our country's agents, offering in trade certain potential values in the equipment. If we bargain well in expending them we will fulfill our obligation to our country. If we bargain poorly and are wasteful of these values, we will fail in our obligation. These statements are not mere patriotic flag-waving. I offer no apology for them. The future of our country as well as that of our railways is endangered. It is our clear duty to keep this fact in mind at all times and to let it govern us in all of our actions.

There is little that is new in the suggestions that are to follow. After all, the things that we should do now because of our country's extreme need are only those we should have done, and perhaps many of us did do, when the railways' needs were the only incentive.

There are two potential values in our equipment which must be expended with care if a full return is to be obtained. The first of these is time, representing the maximum number of days service life that can be obtained from any machine. This can be affected in three respects: First, lack of care in expending it may reduce its value with great rapidity. By lack of lubrication, by failure to make repairs or adjustments promptly when needed, by rough handling, or by other neglect or careless treatment, a machine may be so damaged that its expendable service life is at once reduced by a large percentage. Second, the expendable time may be so involved with the time of a labor gang that with any loss of machine time one may expect a waste of man-hours. At the least, it may be only the time of the operator; at the most, it may be the time of a gang of considerable size. If the failure of the machine was unnecessary, the loss of man-hours is the "boot" we pay in our bargaining. Third, considering the urgency of the work to be done and the limited equipment with which to do it, it is essential that this value be expended as rapidly as possible. Failure to get an adequate return in expending the machine's time and in getting it quickly is driving a poor bargain under present conditions.

Idleness Brings No Return

It is to be remembered that an idle machine brings no return. Only by keeping it in continuous service in productive work is the desired return obtained. This is not appreciated as fully as it should be. We sometimes fail to realize that, like the farmer's mule, the machine may "eat its head off" in idleness. True, while idle, it consumes no fuel, nor is its physical depreciation great; yet it is bringing in no return when an immediate return is one of the elements in its value. We may well, then, look into the causes of idleness.

Failure to plan the work properly may cause the machine to remain in idleness. In a report to the American Railway Engineering Association several years ago, John R. Mabile, then in charge of work equipment on the Chicago, Rock Island & Pacific, made the pertinent suggestion that "scheduling the work instead of scheduling or assigning machines" is the proper approach in planning. The wisdom of this is clear when it is recalled that in many cases the work of the machine is involved with the work of labor gangs. The plan must, therefore, consider both. Again, as Mr. Mabile also pointed out, certain work is seasonal in the sense that it must be done within certain limits of time, while other work may be done at any convenient time. The non-seasonal work should, therefore, be scheduled for the off season. In some cases, too, by a change in the accessory equipment with a machine, it may be made available for non-seasonal work. For example, the tractor used with a mowing attachment during the growing season may be equipped with snow or dirt-handling equipment during the winter season, and the number of days service during the year may thus be increased considerably. With effective planning, the time spent in moving from one job to another may be held to the minimum. If we plan well, we are driving a good bargain.

Much more idleness than is generally supposed can be traced to overloading, to rough handling, to lack of sufficient or proper lubrication, or to a general lack of care. Such abuse of the equipment and the resulting failure may be so far separated in time that the relation of the cause to the effect may not be recognized readily. Where failures recur with any particular gang or operator, be suspicious that abuse is involved. If such causes are not removed, we are driving a poor bargain.

Lack of proper inspection and proper adjustment of equipment is, through unforeseen failure of parts, a frequent cause of idleness. If the condition of the part could not have been determined by field inspection, possibly the resulting idleness could not have been avoided. Too often, however, the cause could have been foreseen, the part adjusted or replaced before failure occurred, and the idleness prevented. A good bargain demands that this be done.

Idleness of equipment while waiting delivery of needed parts is becoming more and more difficult to avoid. Even though the need for the part was anticipated, its delivery under present conditions may be so delayed that failure occurs before it arrives. If the part is an item ordinarily carried in the stores stock, the aid of the supply department may be enlisted both to obtain prompt shipment and to prevent its becoming "out of stock." If it must be ordered from a manufacturer, prompt and careful handling of the order, and early and repeated tracing for delivery are about all that can be done. Probably the principal virtue in tracing is to relieve one's own mental pressure; the manufacturer is probably as anxious to make delivery of the part as you are to receive it. But trace, anyway. The old law that "the wheel that squeaks the loudest gets the grease" may still be in force. At best, one can expect only moderate success in this phase of bargaining.

Checking Materials

The second potential value to be considered in the expending of the equipment is material. What has been said about idleness of the machine may also be said of the parts required for its maintenance. It must be recognized that these often may be idle as they stand in line waiting their turn to be applied. This, within reason, is necessary; but parts may be found on any railroad, the condition and location of which are not justified if we would bargain well. With respect to these, I suggest a check of machines, tool cars and division shops with an analytical and a critical eye, and of each such part ask, first, is it fit for immediate and dependable service? If so, should it be here where it will be available for use on perhaps only one or two machines, or should it be sent to some central point from which it may be shipped out quickly to any one of a number of similar machines when needed? Second, is it worn or broken but reclaimable? If so, should it not go promptly to a shop where it can be put into condition for reuse? The practice of holding second hand

parts of uncertain value on the line should be discouraged. Third, is it scrap? If it is, then, certainly, it should move quickly to the scrap dock.

Many of the materials in the machines are now termed "critical" because the demand for them has outrun the supply. Whether parts are so classed, a good bargain demands that a full return be obtained in expending them. Very often the same causes that result in idleness of the machine also result in the unnecessary use of materials. Any tool or part has a potential service life. If this is obtained, that part has been expended wisely and we have bargained well. If, however, through any of the causes leading to idleness of the machine, the service of the part falls short of what its potential life was, we have expended it unwisely and have bargained poorly.

Cites Examples

As I have been outlining some of the conditions that may prevent the driving of a good bargain in the expending of equipment, you may have recalled some of your own experiences. You remember, perhaps, the time you were taking out those old concrete foundations to clear the ground for the tracks to serve the new airleld at ———. How you did need a compressor and air tools! But there was none to be had. Later, you learned that the supervisor on the next district had the needed equipment standing idle at the time. Somewhere along the line there was a failure to plan properly.

Or you may have been recalling the bridge gang whose motor car was always in trouble because of insufficient lubrication. The car was often out of service, the work of the gang was interfered with and man-hours were wasted, the maintainer was being called more frequently than he should have been, and less than full life was being obtained from the parts he applied. Or perhaps it was habitual overloading that caused the trouble, or too much tinkering by some would-be expert, or neglect of the cooling system, or general lack of care. The results were the same.

Or you may have been thinking of the welder foreman who asked for a relief grinder because he thought the one he was using was "going to take out" soon. When the relief machine was received, the old one, "because it would still run in an emergency" was set in the tool car where it turned up some months later in the same condition as when taken out of service. That foreman had, after a fashion, protected the needs of his own job—but nothing more. If the bad-order machine had gone to the shop immediately for overhauling when taken out of service, the time and materials in it would have been expended with a much greater return.

Worth Thinking About

When we consider these cases and many others, we arrive at one conclusion: All of these failures were essentially man failures; and that is something worth thinking about. While machines may be defective in materials or design, or may wear out in service, back of most machine failures, where time or materials are expended without adequate return, there is a man failure as a contributing, if not a primary, cause. These man failures may arise for many reasons. Let us be charitable and say that many times they were the result of an effort to hurry the work for which the man was responsible at the time. This would have been a worthy aim if it had not been that through his ignorance of the needs and limitations of the machine, time and materials were wasted. In other cases, there may be indifference or carelessness, and in still others, the giving of too much thought to the job at hand and too little to the good of the property, or to the needs of the time.

Man Failure "Is a Contributing if not a Primary Cause" of Most Equipment Failures

On almost any job there is some one man who, under the direction of a division, a district or a system officer, co-ordinates all the activities in his line of work on a definite territory. He may be a roadmaster, a supervisor of bridges or of track, or perhaps a foreman of a large gang. Whatever his payroll classification may be, I will here refer to him as the supervisor. While a machine is working on the supervisor's territory, the supervisor ordinarily will be the man who directs where, when and how the work shall be done, and the man to whom the operator will look for supplies. In my judgment, he is the key man in eliminating these man failures.

The supervisor is a busy man. He is burdened with many responsibilities aside from the work of the machine. Again, especially if trained in the days of hand labor, he may be without a good knowledge of the capacity and limitations of the machine and its needs in the matter of lubricants, supplies and accessories. Lacking that knowledge, he may look on it, not as something to be expended with care, but as a careless man might look on money picked up in the street—something to be spent without regard to its value and when spent to be done without. Even with a good knowledge of the purpose and capacity of the machine, he may still consider its work only from the narrow viewpoint of his own territory and his own requirements and, expecting that it will soon move on to another point, give it only the attention necessary to keep it running until his job is done, forgetting that the conservation of it as a functioning unit is of an importance that is not limited to his territory alone.

The supervisor's knowledge of the machine and his attitude toward it will have a large bearing on the return secured from its use. If he ignores its needs or capacity, he may thereby become responsible for a failure in operation and for a waste of time and materials. If the operator says of him that "he rides by on his motor car every day, but I haven't had a chance to talk with him in weeks," you may be sure that a full return is not being obtained from the machine. In such a circumstance, the operator reasons that "since the supervisor has little concern for the work of the machine, why should I?"

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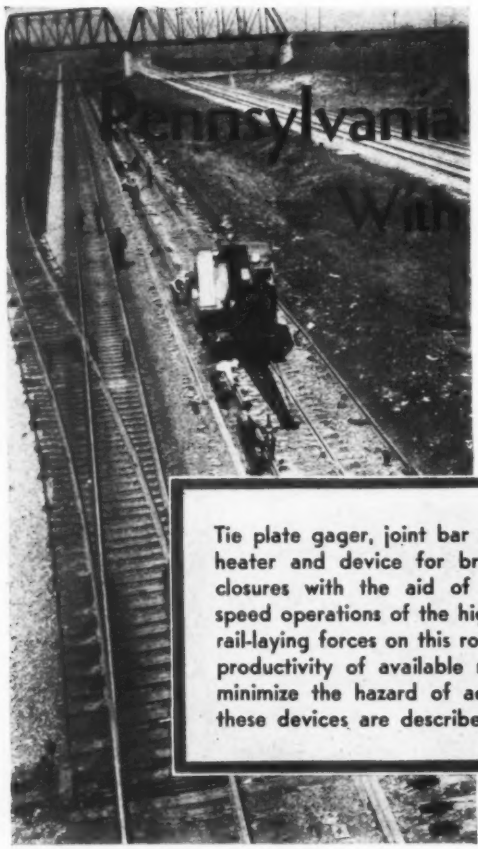


Tie plate gager, joint bar clamp, creosote heater and device for breaking rails for closures with the aid of the rail crane, speed operations of the highly mechanized rail-laying forces on this road, increase the productivity of available man power and minimize the hazard of accidents. All of these devices are described in this article

Pennsylvania Speeds Up Rail Laying With Newly Developed Tools

TO increase the efficiency of the men, improve the quality of the work, minimize the hazard of accidents, and, withal, speed up a most essential element of track maintenance with minimum interference with train operation, the Pennsylvania has been employing with certain of its highly organized rail-laying organizations several recently developed units of equipment which have proved highly effective in all of the above respects. The more important of these new units, which are in addition to power spike pullers, rail cranes, power adzers, power wrenches, power spike drivers and other generally accepted units of rail-laying equipment, include a tie plate gage, which sets all tie plates to gage for the proper alinement and seating of the new rail; a joint bar clamp to assist in hanging the new bars accurately and to simplify preliminary bolting operations; an improved machine for applying creosote to the newly adzed tie surfaces, which provides also for the heating of the creosote during cold weather; and an ingenious home-made rail-holding device, used in conjunction with the rail crane, for cutting rails when making closures.

The tie plate gages being employed are relatively simple devices to permit the rapid placing of the plates on the newly-adzed tie plate seats, and the equally fast adjusting of the plates to true alinement and gage to receive the new rail. Through the use of these gages, fatigue of the men through constant bending over is reduced, and the difficult and tedious adjustment of the plates beneath the new rail by tapping them with spike mauls is avoided.

Description of Gages

Each plate gage consists essentially of a light angle gage bar, the feature of which is a rectangular dished plate on one end, concave downward and about the size of the plate rail seat, and a stop block on the opposite end, which is placed against the in-position running rail to indicate the true gage of the opposite plate. A light steel rod handle above the bar at about waist height permits the use of the gage without bending over, and gives the bar a total weight of approximately 10 lb.

Following immediately behind men dropping the new plates on the newly-adzed ties in approximate alinement, two men with the plate gages follow, each gaging the plates on alternate ties. With the simple operation of setting the dished plates of the gages between the shoulders of the tie plates, these men slide the plates inward or outward, and sidewise if necessary, until they are in true position as indicated by the stop block, a short welded-on section of steel angle, when it is tight against the gage side of the opposite rail. Generally, a single movement inward or outward, usually only a fraction of an inch, is all that is necessary to true up each plate, requiring only a matter of seconds, or momentary hesitation on the part of the gage operator.

Joint Bar Clamps

The joint-bar holding clamp being used in conjunction with the rail laying is a relatively simple hook and lever device, operated by one man, which is used to hold the opposite joint bars in true position against the rail while the joint bolts are placed by hand and made finger tight. As used, the hook of the clamp reaches over the top of the rail, the forward end contacting the lower part of the bar web. The rear end of the hook pivots a lever arm, or handle, in such manner that pressure downward on the handle forces the inner end inward, drawing the near bar up into position snugly against the rail. With the two bars thus held in position, the end bolts are inserted and the nuts are drawn up finger tight, following which the clamp is released and the remainder of the bolts placed.

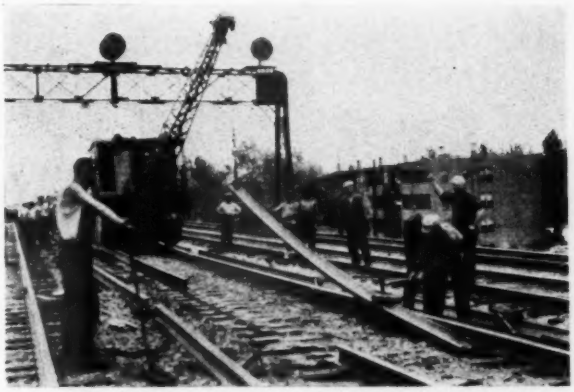
Especially with the heavy six-hole bars that have been used by the Pennsylvania, the joint clamp greatly facilitates the hanging of the bars. Usually, three groups of two men each hang the bars in the large rail-laying operations of the road, each group being supplied with one of the clamps, and carrying out the work at every third joint. Directly behind the bar-hanging crews, a power bolting machine with a crew of two men, one

with a maul for driving the bases of the bars inward, tightens all bolts to complete the joint operations.

Creosote Applicator

The machine being used for applying creosote to the newly-adzed surfaces of ties is an adaptation of earlier machines used on the road, with the unusual feature of providing for the heating of the creosote, when necessary, directly within the tank container of the unit. Essentially, the machine includes a 55-gal. supply tank mounted on two double-flanged wheels; an adjustable supporting leg for holding the tank in an upright position on the rail if the operator should have to step away from it for any reason, avoiding the use of an outrigger arm across the track; and an 8-in. wide fibre brush, which is connected to the reservoir tank by means of a curved pipe handle and a short length of rubber hose. Passing through the brush handle, the creosote is distributed within the brush to maintain an adequate quantity for brushing the tie surfaces rapidly, the amount of flow being regulated by a valve directly at the tank outlet.

The creosote heating feature of the supply tank, which was added for use in cold weather to re-dissolve precipitated salts in the creosote oil to permit ready flow to the brush, gives the tank the appearance of a small, old-fashioned wood-burning locomotive, a small firebox having been provided beneath the reservoir tank, with a tapered sheet metal stack at the front end for draft. During those days when heating of the creosote may be necessary, the lower section of the smoke stack, which is integral with the unit as a whole, and about flush with the top of the tank, is extended upward by a three-foot length of sheet metal pipe to improve draft conditions. During the warmer months of the year, when heating of the creosote is not necessary, this stack extension is stored with other material kept on hand in the rail train supply car. Any available kindling is suitable for the creosote warming operation, and the fire is lighted only at such intervals and maintained only long enough to give the creosote the proper fluidity for ready application.



The Rail-Holding Device Is Used With a Crane While Making the Final Break in the Closure Rail

Rail Breaker

The home-made rail-holding device being employed by the rail gangs to simplify the cutting of rails for closures makes possible the highly practical and expedient use of the rail crane for bending the rail in effecting the final break, without the strain and hazard involved where a group of men are called upon to bend the rail with lining bars. The principle involved in breaking the rail with this device is practically the same as in normal chisel cutting and bending of the rail to effect the final snap, but in this case, after the chisel marking, the loose rail is held down at the point of cut by the rail-holding device, while the rail crane is used to effect an upward strain on the long end while the final chisel blows are made.

The rail-holding device, as shown in one of the accompanying illustrations is a sturdy, reinforced Z-bar shape, constructed of short lengths of structural steel channels. As used, one leg of the Z-shape is thrust beneath the fixed rail of the track to a firm hold, while the upper horizontal leg forms a fixed fulcrum point about

(Continued on page 214)

Two of the Tie Plate Gages. Note the Dished Plates on the Head Ends

Rear View of the Creosote Applicator. Note Firebox

How the Joint Bar Clamp Is Used In Hanging the Bars

Crawler Cranes

By A. A. Cross

Division Engineer,, N.Y.N.H. & H.
Hartford, Conn.

This Close-Up View of a Combination Crane Shows the Driving Mechanism that Is Brought Into Play When It Is Operating on the Track

A. A. Cross

WITHIN the past five years there has been a definite trend toward the use of off-track equipment for conducting certain phases of maintenance work. This is true primarily because such work can be done more economically when there is no interference by rail traffic, and, secondly, but none the less important, the work can be done without interfering with rail traffic, a factor of great importance in these days when the railroads are struggling for maximum efficiency in handling war traffic. Off-track equipment has done away with the need for work-train service in many cases where it was formerly necessary under the old method of conducting the work. This has been a boon in many respects; in addition to increasing efficiency, it frees the rails for other traffic, and releases crews and power for use in operating revenue trains.

That the development of off-track equipment of the crawler type has been welcomed by the railroads is indicated by the more extensive range of designs that are in use today as compared with a few years ago, and the further fact that railroad budgets have been stepped up for the purchase of these units. One road, which has gone in extensively for the purchase of off-track crawler-type equipment, reports that $85,000 worth of such equipment purchased five years ago has paid dividends to the extent of several hundred thousand dollars per year in the operation of that railroad. Work-train savings alone have amounted to more than $250,000 per year.

In the face of these economies, and the taxing of the rail systems of the country to the utmost by the heaviest traffic in their history, because of war production, transportation of armed forces, etc., the output of off-track crawler-type equipment has been frozen by the War Production Board. Railroad requirements of this equipment would be about one per cent of the estimated 1942 output. One might well wish for a partial thaw of the WPB order so that such equipment, so necessary to the railroads to "Keep 'Em Rolling," could be released to them.

While there is no disputing the fact that off-track equipment is more desirable in many respects, there are still uses for on-track units in railroad maintenance work. It would seem, therefore, that the development of a crawler-type crane, so designed as to be easily convertible for operation on the rails, would place at the disposal of the railroads a piece of equipment which should prove of inestimable value as a year-round multiple-purpose unit. Such a machine has been used for the last two years on the New Haven, primarily in rail-renewal operations, although there appears to be no limit to the work which can be done with such equipment, both on and off the track, either alone or in conjunction with other work units. A crane of this type is capable of handling a shovel, a drag line, a clam shell bucket, a drag shovel or hoe, or a magnet.

How Idea Originated

A survey of rail-loading equipment by the New Haven management several years ago resulted in a decision to replace as soon as possible the units then in use, which had been in service for many years and which had become outmoded. It was while considering the design of a machine for replacing this old equipment that the idea was conceived of developing a unit equipped for all-around work. The first attempt was to use a conventional crawler crane. When used in rail-laying operation, the treads straddled the running rails. The performance of the machine in this type of work was not too successful, as tracks bolts, guard rails on bridges, etc., interfered with the free operation of the crane.

Out of this experience came the idea of equipping a standard crawler-type crane, developed to a high degree of perfection as a result of several

*A paper presented before a meeting of the Metropolitan Maintenance of Way Club at New York.

With Flanged Wheels Prove Versatile Units on New Haven*

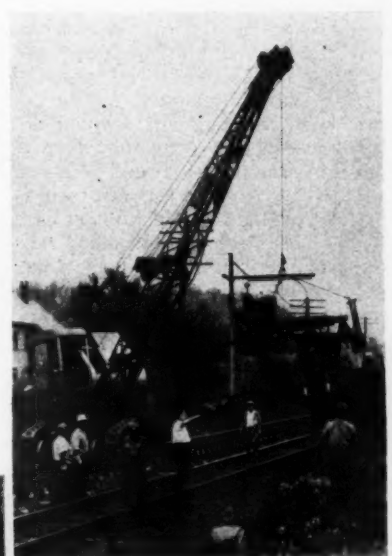
The New Haven is among those roads that have been quick to see the advantages of crawler-type off-track work equipment, but, at the same time, it recognizes that there are many operations, such as the laying of rail, that can be performed economically by on-track machines. About two years ago the idea was conceived of combining the advantages of the two types into a single unit by equipping a crawler crane with flanged wheels, thereby creating a multiple-purpose machine capable of operating on or off the track at will. This article tells the story of this development and of the results obtained with the combination machines

years' pioneering, with flanged wheels placed inside the treads, which could be raised or lowered at will, according to whether the unit was to be used on or off the track. About two years ago the first unit of this type, consisting of a crane weighing 10 tons, was received on the New Haven. Two of these cranes, equipped with flanged wheels, were obtained and were used initially in laying rail.

Additional Units Acquired

The results obtained with these original machines were so gratifying that it was decided to acquire four additional units. Experience with the initial machines had indicated that, if larger cranes were used, they would be adaptable to a greater range of operations, thus making them more nearly all-purpose machines. Accordingly, the new units consist of cranes weighing about 18 tons.

Each of these larger cranes is powered with a six-cylinder water-cooled gasoline engine, has an electric starter, and carries a gasoline tank of about 50 gal. capacity. The boom used for ordinary work is 35 ft. long and is so constructed that it can be increased in length to as much as 60 ft. by adding sections 5 ft. or 10 ft. long. Each crane is equipped with a set of flanged wheels that are so controlled hydraulically that they can be raised to clear the rails by 6 in. The speed when operating on the rails ranges from 1 to 12 miles per hour. When traveling on the treads a speed of about 1½ m.p.h. can be maintained. These new machines will operate for about 8 hr.



Right, Above—Operating As An On-Track Unit, This Combination Crane Is Loading a Power Adzer on a Truck. Right—Laying Rail With a Combination Crane

on 20 gal. of gasoline, and the oil consumption is extremely low. It is quite probable that heavier types of crawler equipment will in time be equipped with flanged wheels, thereby widening the scope of the work which can be handled to include such operations as the driving of piles, etc.

Handling Track Materials

To date the crawler cranes with flanged wheels have been used most extensively for the various material-handling operations involved in making rail renewals. Most of the new rail received by the New Haven comes in drop-end cars. Previous to the receipt of crawler cranes, this rail was unloaded by rail loaders or ditchers. This meant that each unloading unit could take care of only the adjacent car on either side of it and that, when these cars had been unloaded, the train would have to be completely switched to prepare it for further unloading, resulting not only in train delays, but in losses in the use of labor, which had to remain idle during the switching operation. By using a crawler crane, operating originally from the flat car on which it was transported, the unloading can progress from one drop-end car to the next, as they are emptied, for the entire length of the train, without delays occasioned by switching. To permit the crane to pass from one car to another, the opening between them is bridged with a 4-in. plank under each tread. This method of unloading rails is particularly desirable if the track department enjoys the use of the main track.

Crawler cranes are also valuable units for handling track materials other than rail, especially in these days when there is uncertainty as to the receipt of material. For instance, track departments are often confronted with the problem of releasing cars containing track material before the rail itself is received. It is not desirable in these times to unload such material along the main tracks very far in advance of the rail-laying operation. In such cases, the crawler crane, with its magnet and generator, fills a long-felt want. Cars of tie plates and angle bars can be spotted in a yard and the crawler crane, operating as off-track equipment, can be run alongside the cars to unload them, using only a few men besides the crane operator. When the rail is received and is ready for unloading and laying, the other track materials are reloaded by the crane and magnet for shipment to the point of installation with the rail. One who has been confronted with this problem can well appreciate the labor-saving value of such equipment.

A few years ago such a problem confronted the New Haven at Hartford, Conn., when about 200,000 tie plates were received far in advance of the rail. The unloading of the track materials in the yard was started by hand labor, using 16 men and a foreman, and proved to be a slow and exasperating process. The services of a locomotive crane equipped with a generator and magnet were enlisted, and, with this crane working from a parallel track, the cars were released much more quickly, the plates were deposited well in the clear without being rehandled, and the labor, with the exception of a couple of men, was released for other work. Reloading for later distribution was handled by the same outfit. Under similar conditions the combination crawler-rail crane, equipped with magnet and generator, would be used as off-track equipment.

The Use of a Magnet for Handling Certain Materials Increases the Versatility of the Combination Units

It is in the actual laying of rail that the flanged wheels of our crawler cranes come into use, but before describing the experience with them in this regard it may be well to review the development of rail-laying equipment on the New Haven. Several years ago, with the increase in rail weights, it was recognized that machines would be needed for placing rails in track. Rail loaders, operating in work trains, were tried but their use was found to involve a slow and cumbersome process. While they may have largely eliminated the heavy physical effort of the laborers, they were not economical and soon gave way to the use of a ditcher.

This was used first on a flat car in a work train, and then, in an effort to speed up the operation, the ditcher was used as an on-track unit. By providing the ditchers with gasoline or Diesel engines, the coal and water liability was eliminated, but still they were cumbersome units, and because of their slow speed (3 m.p.h.), they could not clear for trains as quickly as might be desired. Since these machines were not equipped with brakes, it was necessary to reverse the operating mechanism to slow them down and bring them to a stop.

Test Results Given

The crawler-type crane, equipped with flanged wheels for track operation, is easy to handle, and the operator, with six men, can easily lay rails fast enough to keep ahead of a 100-man gang. During a recent test, one of the machines laid one hundred five 39-ft. 131-lb. rails in 55 min. This test was conducted during a rail-laying operation on the multiple-track Shore Line, and use of the track was permitted. On this particular job, six men besides the crane operator were used to set in the rail, including the foreman, one man handling the tongs, one man at each end of the rail to guide it into place (one of whom handled the expansion shims), and one at each end to guide and bar the rail to the approximate gage. As a matter of information, in the best day's performance to date on the Shore Line job, 635 rails were laid in a nine-hour period. This outfit has laid as high as three rails per minute, but there is no advantage in laying rails at this rate as the various operations become crowded and the rail-laying crane runs away from the follow-up gang.

If it is necessary for rail to be laid under traffic, the crawler-rail crane can be removed from the track when clearing for trains by raising the wheels from the running rails, thereby permitting the machine to rest on its treads. This has been accomplished in as short a time as two minutes under conditions where the operation could be conducted at a grade crossing. In the absence of such a crossing, old ties and planks can be used to facilitate the operation—with no great increase in the time required to clear the track.

When unrestricted use of the track is permitted for several hours, the clearing of the unit from the track is

of no importance until the end of the day's work. At that time it can be left clear of the track at a convenient point near where it is intended to start or continue work the next morning.

When Gang is Small

A machine of this type can be used to distinct advantage with a small gang of men where the amount of rail to be laid does not warrant an extensive organization. A particular instance which comes to mind involved the laying of rail in a section of track only about a mile long. Only 27 men with a foreman were used in the entire operation, which entailed the laying of 112-lb. rail to replace 75-lb. steel. The crane proved to be a most important part of this organization. One can well imagine the amount of labor that was saved by the use of this crane, as it would have required 20 men with tongs to handle the rails into the track, and after they had done this for a period of time there is a question whether they would have been in the proper condition for completing the final operations.

The New Haven does not own any drop end cars. Hence, when loading rail the crane is placed on a flat car and its operation is not much different than when a ditcher is used, except that the crane operator is sitting at the front end of his machine and has a considerably better view of the entire loading operation.

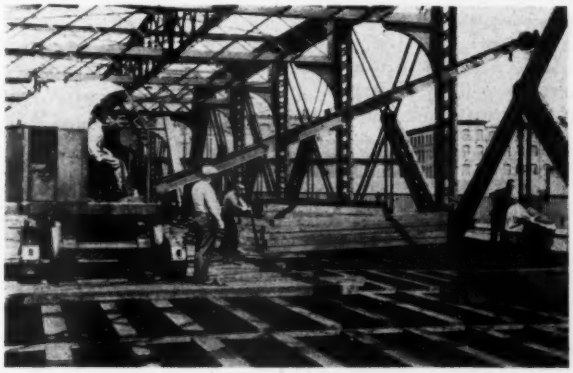
Other Uses

Recently several thousand ties from an abandoned track were loaded by a crawler crane operating as an off-track unit on the abandoned roadbed adjacent to the remaining track. In this operation the ties were piled and blocked in such a manner as to permit slings to be placed around them, thus facilitating the work of loading them into cars. By using the crane, this job was carried out with a minimum of hand labor and without the necessity of switching the cars frequently, an operation that would have been necessary if the loading unit had been made up in the train.

The latest model crawler crane that has been received on the New Haven is equipped with a generator and a 45-in. magnet, which is capable of lifting up to 2,800 lb. Heretofore, in cleaning out scrap bins, it has been necessary to load the scrap into scale boxes which were then handled with a ditcher, or else to load the scrap directly into cars by hand. Using a crane equipped with a magnet, all this labor can be saved by having scrap boxes located sufficiently close to the track so that they can be reached by the magnet, with the result that only a few men are needed and hand labor eliminated.

Crawler cranes have also proved their worth when used in connection with automatic dump trucks in handling snow, cinders, gravel, sand and small materials, and in cleaning up rubbish from yards, etc. The crawler-crane and dump-truck combination can reach locations far removed from the track to carry out material-handling operations which formerly called for a considerable amount of hand labor.

In many locations side ditches that were formerly cleaned by hand at excessive costs can now be cleaned with the crawler crane, operating either as off- or on-track equipment, as conditions require, at considerable savings. Also, roadbed shoulders can be built up with the cranes, working alone or in conjunction with a bulldozer or other grading equipment. A few years ago this work could be conducted only with work trains.



This Combination Crane, Operating on Its Crawler Treads, Is Handling Material on the Deck of an Overhead Street Bridge

Can Release Cars Quickly

Today the requirements for rolling stock are such that cars must be released promptly and crawler cranes can be used to advantage in achieving this end. A crane of this type, working as an off-track unit with a bucket, can clean the bulk of material out of open-top rubbish or cinder cars in a very short time, leaving only a small amount of material that can be removed quickly by a few men.

While most of the foregoing discussion has dealt with the use of the crawler cranes in roadway work, they also have many applications in bridge and building work, such as the handling of heavy timbers, bridge ties, stringers, etc.

To facilitate the loading and unloading of our crawler cranes, each unit is provided with a portable ramp, about 20 ft. long, which can be carried on the idler car under the boom. The ramp can be swung in place by the boom, and in a very short time after arriving at the scene of the work on a flat car, the outfit can be operating on its treads or on the rails, as may be required. At the end of an on-track operation, our cranes have been removed from the track and loaded on a flat car close by with the aid of the ramp in less than 1 min.

In this Material-Handling Job It Was Convenient To Operate the Crane as an On-Track Unit

Memories of 1938

The experiences obtained during the rehabilitation of the properties of the New Haven following the floods and hurricane of 1938 are still vividly

impressed on the memories of those who were engaged in that work. To facilitate the repair operations, the railroad rented a steam crane mounted on crawler treads, which was used for driving piles at a damaged bridge. This crane proved to be an extremely valuable piece of equipment for it was able to get to the site of the bridge, although the track on either side of the structure was impassable, permitting the necessary repairs to be made before the track was restored at either end.

Thus, with crawler equipment available, it is no longer necessary to work from both ends of a badly washed-out strip of railroad. It can be appreciated that when damage is sustained to an extensive mileage of railroad there is a distinct advantage in having a crane so equipped as to operate on the rails or on its treads. In reviewing the experiences of 1938 one can now see where better performance would have been possible if the railroad had then been equipped with combination on- and off-track cranes.

Used in Track Construction

One of these cranes was used with great success by the railroad in the construction of considerable trackage at Camp Edwards in Massachusetts. In this work the ties, rail and other track material were distributed in advance by trucks and trailers. However, a bridge in the course of construction prevented the track from being laid in a continuous operation. But the crane, operating on its treads, ran around the bridge site, completed the laying of the track on the other side of the structure, and was back at the bridge before work on it was wholly completed.

Whenever the crawler cranes must be transported any appreciable distance, it is the present practice to haul them on flat cars. However, it is hoped that the time will not be too far distant when trailers will be provided to permit them to be transported more expeditiously than is possible by this method. With proper planning, there is no reason why these cranes cannot be kept busy nearly every day in the week throughout the year.

Experience with the combination crane indicates that, when working off the track, it can do anything that the conventional crawler crane can. The addition of flanged wheels establishes it as a unit capable of doing any work on the track, with the possible exception of switching, that is ordinarily done by light-weight locomotive cranes. In this connection, however, one of the cranes is being fitted with a stiff shackle so that it will be capable of handling cars in a large yard. Only a little imagination is needed to visualize the possibilities in the use of such equipment in maintenance work on a year-around basis.

Work Equipment—Expending It Wisely

(Continued from page 207)

Or the supervisor may question the operator's judgment as to the machine's capacity or needs. But is his any better? Much time has been lost, much material wasted, and even men have met death because it was not. Because the machine is continually under his observation, the operator is in the best position to know its capacity and needs and how it must be handled to obtain maximum trouble-free production. But operators vary in abilities and disposition. One may handle his machine carefully but be careless or shortsighted in maintaining it. Another may handle it roughly but maintain it well. Whatever his capabilities may be, the sympathetic counsel of the supervisor will better the results obtained.

Maintain Instead of Repair

The third man concerned in the output of our equipment is the field mechanic or maintainer. Too often, we call him a repairman, and far too often consider him just that—a trouble shooter who stays in the background until the machine breaks down, whereupon he pops out, waves his magic wand and presto, the machine is running again. Unfortunately, his wand waving has slowed up badly since we are encountering delays in getting parts; for his functioning as a repairman usually calls for repair parts, and that usually means the replacement of parts before their full life has been secured. Suppose, therefore, we call him a maintainer and hope that as such he will, by visiting the machine frequently, inspecting it carefully and conferring freely and sympathetically with the operator, keep it running instead of having to "get it back in service quickly."

The manner of handling work on different railroads varies greatly and so does the manner of handling equipment. The practices on one road may be very different from those on another, in the manner of scheduling the work, in the methods of maintaining the machines or in the channels through which needed parts are obtained. But whatever these practices are, without sympathetic co-operation among the men associated closely with the use of the machine, full return cannot be obtained for the time and materials expended, and we will not have bargained well.

Let me repeat, in these war-time days we have a new obligation. We cannot now live by the rules which it has been our custom to follow. No longer does waste of time and material affect only the company's pocket book. Instead it affects vitally the lives and future of our fellow men. Whatever may be the personal view of each of us as to why we are in the war or whether we should be, the fact remains that we are. And since we are, our very clear duty is to give every possible aid to the war effort. Our machines are expendable. If we expend them wisely and secure the greatest possible return, we have bargained well. Let us not permit the wasting of the time and materials in them to spoil our bargain.

Speeds Up Rail Laying with New Tools

(Continued from page 209)

which the rail to be cut can be bent upward. A guard block at the outer end of the upper leg holds the rail on its side during the final break, and prevents it from jumping out of position.

In effecting a rail cut, the rail to be broken is first chisel-nicked on one edge of the base, then continuously across the base, and then on the opposite flange edge. With this done, the rail is barred laterally beneath the rail-holding device, already set up under the fixed rail of the track, with the point of cut immediately adjacent to the side of the hold-down facing the longer end of the rail, or the end to be elevated by the rail crane.

Grasping the long end of the rail, the crane then lifts this end, first to proper contact against the outstanding leg of the hold-down, and then on upward to put bending tension in the rail while the chisel and maul men strike one or two sharp blows on the upstanding flange of the rail at the point of cut, which are usually enough to make the rail snap with a clean break. Through the method of breaking rails, four men at most are employed, including the crane operator, and the hazard of accident to the men is reduced to a minimum.

All of the devices described have been developed on the Pennsylvania and have been made in its maintenance of way shops.

Can the Railways Get Work Equipment?

(Continued from page 203)

needs of the railways direct to the Board, should also insure that the requirements of the railways will be heard.

In the light of all of these considerations, that railways will get their essential requirements in maintenance work equipment in 1943 seems assured—if they will establish the essentiality of these requirements beyond a shadow of doubt—will follow the procedure that has been set up to secure authority for purchases, and will take advantage of all of the means that will lead to the early placement of orders and the fullest co-operation with the manufacturers. It is not necessary that maintenance officers know the intricacies of the CMP with its allocations and priorities. Each road has specialists in these matters in its purchasing department. But it is incumbent upon maintenance officers that they anticipate their needs and advise their purchasing officers as far in advance as possible; that they make the most intelligent requests for equipment, knowing through constant contact with the representatives of railway supply manufacturers the types, designs and quantities available under WPB limitation orders; and that they fortify their purchasing officers with irrefutable facts and figures relative to the essentiality of their needs.

Figuratively speaking, the purchasing department, in its relationship to the War Production Board, is as the defense attorney before the court, and the maintenance officer in need of equipment is his star witness. In a situation where the urgency of every request must be established beyond question—always with the advancement of the war effort in mind, the purchasing department is helpless before the War Production Board without the proper backing of the user department concerning essential requirements.

Under a national material situation where the demands outstrip the supply, and in which every critical commodity, from its raw state to finished products, is under rigid regulation and control, maintenance officers must not overlook the foregoing facts. Fairness and patriotism demand that through every possible expedient their requests for new equipment be whittled down to minimum requirements, but when this has been done, they are unfair to themselves and to their railways, and are jeopardizing the very war effort that they seek to serve if they do not press for their essential requirements early, adequately and persistently. Playing the game in all of these respects, there is every reason to believe that the railways will get enough work equipment in 1943 to carry them through and enable them to continue their remarkable performance to date in the interest of an early and victorious consummation of the war.

Meeting a Crisis—With Work Equipment

(Continued from page 200)

on the job with minimum loss of time. For sawing heavy timbers or making pile cut-offs, such a saw saves time and obviates much back-breaking drudgery.

Much has been written about the value of paint spraying equipment, but irrespective of this, the present crisis warrants more being said. Bristle brushes must be conserved for few are available and there are certain places where they have to be used. At the same time, it is found that such young or inexperienced men as may be available for painting, readily take spray painting and do it well. Besides the usual spray guns, a small quart-size spray pistol should be provided for fine trim work and for painting signs. Of course, proper stencils must be provided for the sign painting work.

For such small jobs as arise around terminals, at the site of which air or electricity is not available, small portable electric or air generators, mounted wheel-barrow like, are convenient and save labor. Jackhammers, paving busters, dirt tampers, saws, riveters, drills, bits, reamers and grinders can be operated quite effectively by such plants, thus enabling a few men to complete many types of work that might otherwise require the use of a sizeable gang.

Shops and Enginehouses

Fortunately, most shops and enginehouses are equipped with air and electricity and have available for building men tools necessary for working metals. There may be no concrete and wood working tools in the store rooms, so that such tools must be provided. It is unfortunate, especially in these days, for bridge or building men to do any work with hand tools in or around shops where power is available to operate power tools, because such tools do this work faster, better and with less human effort.

Among the power-driven tools that will well pay for themselves in bridge and building work are air and electric saws of proper sizes, augers, and concrete working or other tools that can be used to advantage and cannot be drawn from the shop tool room.

Docks and Wharves

Docks and wharves call for special equipment, and such equipment is most readily adapted to power operation. The pile driver is, or should be, mounted on a power-driven scow so that it can move itself where needed on short notice. The power that operates the scow, or at least that which runs the driver, can operate the proper power machines. These include saws of proper sizes; augers, bits and reamers; riveters and busters; paint sprays; tool sharpeners; and pumps and other equipment as needed. It can be said there that with the ready opportunity to house and take care of power equipment properly on dock and wharf work, it is particularly unfortunate to use labor with arduous hand tools for tasks that can be done more economically by power.

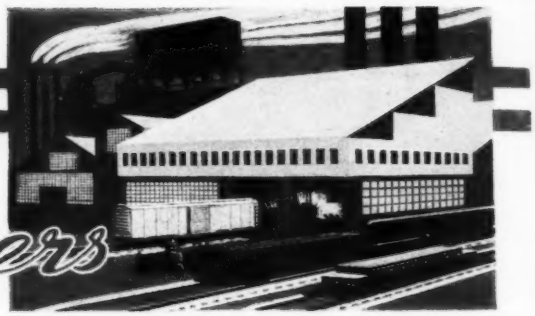
Water Service

One of the greatest boons to the water service man on the railroads is welding, both electric and acetylene. The practice of welding pipe in water service is already treated adequately in the literature that is available, so it will not be elaborated upon here, but it must not be overlooked as an economical means for saving labor. Water service men should be furnished also proper power-operated pipe fitting tools and with paving busters and dirt tampers where needed.

Summary

Every man remaining in the bridge and building departments of the railroads is rendering just as important service today as if he were in North Africa or the Solomon Islands; in some respects his part is more important than being in the armed service. If bridge and building men should crack, which, of course, they will not do, the American way of doing things would cease. The American way is to do work with power and machines. We will win this war with power and machines and the bridge and building men on the railroads will play no small part in this victory by using the power machines that are available to the utmost erg. They are thankful that they may contribute their share toward ultimate victory by doing this.

PRODUCTS of Manufacturers



Flame Hardening and Tempering Frogs

A NEW process of simultaneous flame hardening and tempering railroad frogs, which is said to eliminate the necessity for reheating the rail surface after hardening to bring the hardness down to the desired amount, has been developed by the Air Reduction Sales Company, New York. The process embodies the use of a standard multiflame oxyacetylene flame-hardening tip, a quenching jet and a soft multiflame heating tip, in the order named, mounted on a movable jig to form a single unit. This unit permits the production of any intermediate degree of hardness in a single, progressive operation. All phases of the process may be controlled to produce uniform results.

In operation, the unit is moved progressively over the surface to be treated at a definite rate of speed for a desired depth of hardness. The quenching jets, following the heating flames, cool the surface, thereby producing hardness. By applying a definite type of quench under a sufficient volume and pressure it is claimed that a definite degree of hardness may be obtained. The tempering tip, following behind the quenching stream, heats the hardened area to any desired temperature, thereby drawing the temper of the hardened surface and producing a lower degree of hardness.

The intensity of the tempering flame is varied at will by varying the pressure of gas used, which provides a positive means of controlling the surface temperature after the flame-hardening operation. The temperature to which the hardened area is raised will determine the amount of the tempering that will result and thereby the final degree of surface hardening. With the device in use it has been found necessary to use a baffle plate behind the quench to reduce the excessive splashing of the quenching stream toward the tempering flame, thereby assuring a uniform degree of tempering.

Hardening a Frog Point by the New Simultaneous Flame Hardening and Tempering Process

Tournaweld Electrode

R. G. LeTOURNEAU, Inc., Peoria, Ill., is introducing a new electrode, Tournaweld RW (Roller-Weld), that is developed specially for use in building up track rollers, rails and similar parts of crawler tractors and other machines subjected to a combination of impacts and heavy bearing wear. This new electrode operates with greatest efficiency on reverse polarity with a DC welding machine. The rod is black in color and comes 14 inches long, in diameters of 5/32 in., 3/16 in. and ¼ in. The new electrode has been thoroughly field-tested and is characterized by rapid burn-off, smooth operation and uniform deposit of highly alloyed, tough, hard surfacing metal which is sufficiently soft in the as-deposited condition to be ground according to the best practice employed in rebuilding track rollers on crawler tractors.

Buda Tie Nipper

A PORTABLE Tie Nipper, which weighs only 38-lb. and can be operated by one man, thereby releasing one or two men who are normally used in nipping, has been introduced by the Buda Company, Harvey, Ill., for tie tamping or spiking operations.

The Tie Nipper Holds the Tie Firmly Against the Rail for Spiking or Tamping

The Tie Nipper is constructed of two steel arched tubes 43 in. long and 12 in. high, with electrically-welded base plates, from which tie tongs are suspended at the center by a chain. In use, the tool is placed over the tie to be nipped, parallel with the rails in the center of the track or at one end

of the tie. The tongs are raised by a lever, pulling the tie firmly against the rail. The lever is then locked in position by a strong, easily-operated latch, thereby releasing the operator for spiking or tamping. With this tool, a tie may be lifted five to seven in., the maximum lift being provided in cases where one end of the Tie Nipper rests on the ballast, although normally both ends rest on adjacent ties. The tongs are made of rust-resisting steel and have nippers with edges especially designed to prevent injury to the tie. Wide base plates provide a firm foundation for the nipper.

The Tie Nipper can be easily carried by one man and, on the approach of a train, can be released and removed from the track in 10 seconds or less. It is said that the mechanism is simple and fool-proof, requires no maintenance and that the tool is ruggedly built of durable materials.

Improvements in Fairmont Motor Cars

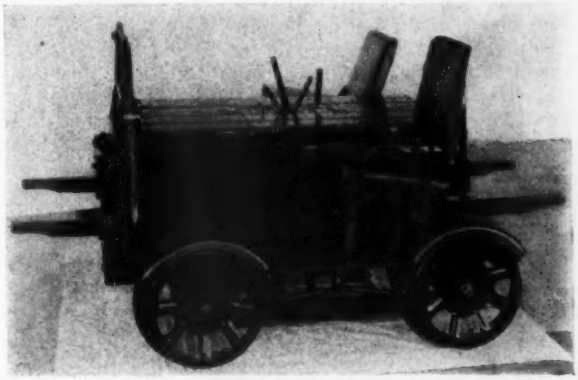
FAIRMONT Railway Motors, Inc., Fairmont, Minn., has developed several new accessories for use with its motor cars and has made a number of improvements in its Class M19, Series E; M9, Series D; and M19, Series D spring-mounted inspection motor cars.

An improved axle bearing and spring mounting unit permitting simplified take down and assembly, have been provided for the spring-mounted inspection cars. The support frame tying the rail skid to the frame, and also anchoring the guides for the axle bearing, has been eliminated and, instead, the guide tubes are clamped between the rail skid and frame side member, and a side plate provides increased strength. The removable seat top is now made of one-piece plywood, specially bonded to resist the effects of outdoor use and the number of bolts and fastenings has been reduced materially. Other improvements to these cars include a light weight iron and steel belt pulley and linkage, and the use of a longer and larger spring to give easier starting and provide fuller protection to the belt throughout the entire range of adjustment.

One of the new accessories developed by Fairmont is a two-speed transmission for section cars, which will increase the available draw bar pull by being equipped with a low gear, yet allow for good track speeds in high gear. Basically the same as the transmission used for many years, the unit now has refinements and adaptations for the belt control pulley. Full adjustment for this pulley is provided in both directions, simplifying installation and field adjustments. An improved, long life seal offers better service with less maintenance.

Another new accessory is a sealed beam headlight which has a full swivel mounting. It provides better illumination and can be used on windshield-equipped cars with minor changes to the curtain.

To provide added comfort, Fairmont inspection cars can now be equipped with either of two models of new side seats, one with a folding back and the other with a fixed back. The folding back model is available with either a padded spring seat cushion, or a foam rubber cushion. The seat has a plywood base, strong supports and a metal hinge. The plywood back is curved and padded. The fixed back model includes a plywood base for a pad-covered spring cushion, strong support legs and a padded plywood back. The seat covering of both models is a durable imitation leather. These seats are strongly constructed and may be applied to new cars or to cars already in service.



A Fairmont Inspection Car Equipped with the New Side Seats

A Number of Improvements Have Been Made in the Design of the M-19, Series E; the M9, Series D and the M19, Series D Motor Cars

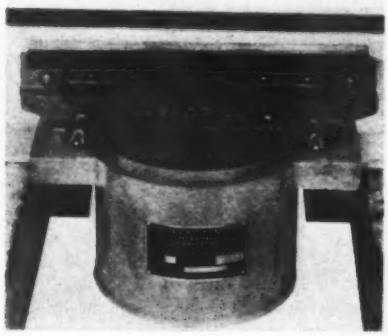
New Rail Lubricator

THE LUNDIE Engineering Corporation, New York, has produced a new type of rail and wheel flange lubricator known as the Aladdin, the purpose of which is to prolong the life of a rail by assuring proper and continuous lubrication at critical points, such as territories with sharp curvature, yard leads, etc.

The Aladdin rail and wheel flange lubricator consists of an oil cylinder which fits into the space between two ties, a heavy floating piston and a broad spout, extending toward the rail. At the upper end of the spout, a thin, adjustable tongue plate, on edge, the mouth of which is 22 in. in length, fits closely against the gage side of the rail and controls the spout opening.

The lubricator is supported on two springs secured to two brackets which, in turn, are clamped to the rail without necessitating alterations to the track. The lubricator is actuated by the vibration set up in the rail by the oncoming wheels of a train, the vibration being transmitted to the cylinder through the brackets and springs securing the cylinder to the rail. In operation, the weighted piston gradually descends into the cylinder during vibration and the lubrication is forced up the spout

and emitted between the tongue and running face of the rail in order that passing wheels may pick it up and carry it forward. The springs are so adjusted that the top of the lubricator mouth is kept in contact with the underside of the rail head and grease is prevented from escaping at that point. The springs also permit the lubricator mouth to be depressed without damage. The entire unit is very



The Aladdin Lubricator Without the Cover

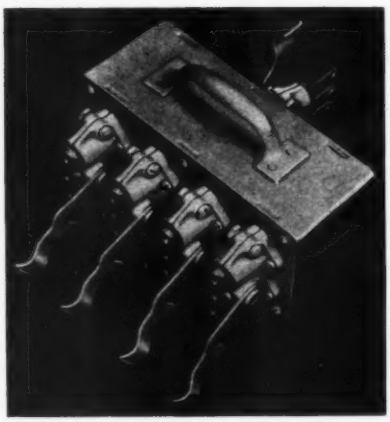
compact and it is provided with a heavy cover.

The Aladdin lubricator operates with a specially prepared and tested fluid designated as the Aladdin Grease Compound Lubricant. It is easily refilled through an opening provided in the cover for that purpose. The brackets are adjustable for width of rail base and height of rail, so that the lubricator can be attached to any rail.

Junction Box and Outlet Box for Jackson Tampers

A NEW unit, known as the C-202 A Junction Box Assembly, has been developed by the Electric Tamper & Equipment Company, Ludington, Mich., for use with the WS-8 (8-tool) power units for Jackson tampers, as a means of eliminating the use of a double wye cable and reducing the amount of rubber-covered copper wire cable required. This company has also improved its WS-4 power unit by installing an improved outlet box.

The C-202 A Junction Box Assembly is said to be a substantial improvement over the double wye cable in that it is easier to move about on the track than the former unit which it replaces. Each 8-tamper plant is furnished with two 100-ft. line cables and two junction box assemblies. The male plug on each junction box is connected to the female plug at the end of the line cables, and each junction box accommodates four tamper motor leads. When the tampers are



The C-202 A Junction Box Assembly

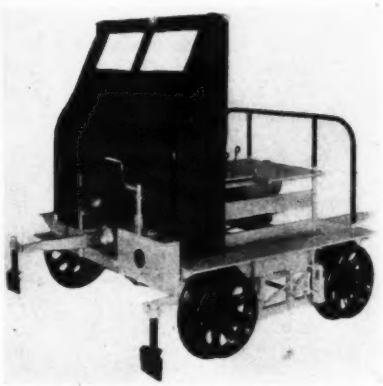
to be moved ahead, it is only necessary to pick up the junction boxes and carry them forward, instead of, as previously, gathering up the wye cables and freeing them of possible entanglements with ties and other projections. The junction box is unusually compact, measuring only 10½-in. in length, 4-in. in width, and 5-in. in height.

The new outlet box on the WS-4 power plant is an improvement over the former outlet box, due to the fact that all three-phase plugs now lead out straight from the generator, whereas formerly it was necessary to plug the tamper motor lead cables in from the side, which necessitated creating a curve in the cables. This was hard on the cables and shortened their life. With the new setup all outlets, including the single-phase outlets, are in one box.

The WS-4 Power Unit Equipped with the New Outlet Box

Improvements in F-M Motor Cars

A NUMBER of new improvements have been included in, and several new accessories have been developed for the latest models of motor cars manufactured by Fairbanks, Morse & Co., Chicago. The line of one to four men inspection cars, has been redesigned and improved and is now known as the Models 54-B and 754-B. The heavy-duty section car, Model 44-B, includes several improvements and the five-gallon gasoline tank is now standard equipment on this model. This company is also bringing out Victory models of its No. 57 and the

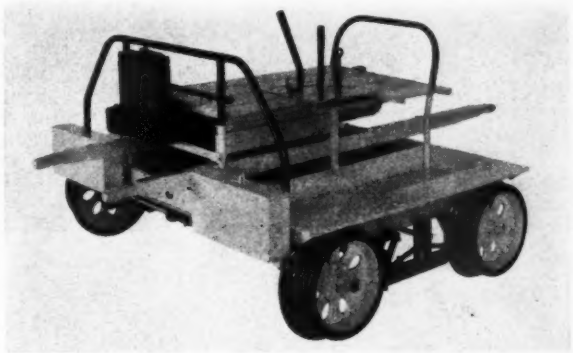


The 54-B One to Four Men Inspection Car Equipped with the New Windshield, Rail Sweeps and Electric Light

No. 757 motor cars, in which all aluminum and alloy steel have been eliminated, with very little increase in weight. These cars will be known as the V-57 and the V-757. A large body section car, known as the No. 59, has been added to the line, which is similar to the standard section car, the 44-B, except that it has a frame, deck and seat approximately 18 in. longer.

This company has developed a line of high-grade light, thin-wall all-castiron pistons for use in its cars in place of aluminum alloy pistons which are unobtainable for the duration of the war. In addition, several new accessories have recently been produced for use on the motor cars made by

this company, including new spring release rail sweeps for all models; motor car tops with side and rear curtains for all models; a slanting type of windshield for various models; and electric lighting equipment for inspection motor cars, using batteryless generator equipment, thus doing away with the necessity for a heavy storage battery on light cars.



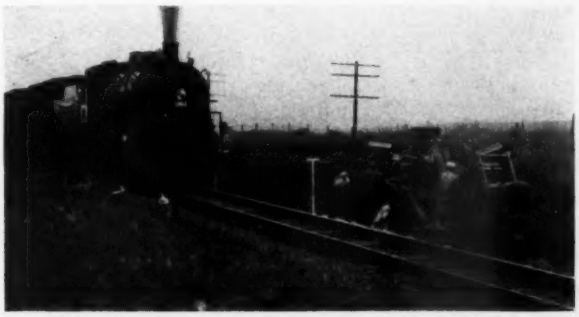
The Victory Model V-757 in Which All Alluminum and Alloy Steel Have Been Eliminated

Ditching Machine For Subdrainage Pipe

YOUNG & Greenawalt, drainage engineers, Chicago, report an interesting use of a specially designed ditching machine for installing subdrainage pipe parallel with the track which does not interfere with traffic and which does the work of 35 men.

This company, which formerly fabricated and installed corrugated iron pipe to eliminate water pockets and soft subgrade conditions, has been stopped from using such pipe by government restrictions and for some time has been installing vitrified tile pipe instead. Faced with a large increase of work of this nature, it requested one of the ditching manufacturers to make a machine that could be used safely and economically for installing tile and not interfere with traffic. This machine is exceptionally narrow and low and after being placed in operation, it was redesigned and rebuilt by Young & Greenawalt men to meet their requirements. It is now operating satisfactorily and has been used extensively during the last six months to install more than 250,000 ft. of tile in longitudinal (not lateral) drains.

The machine will excavate to a maximum depth of 6½ ft. and to a maximum width of 2 ft., although 95 per cent of the ditch that has been dug was only 13 in. wide. The discharge of the machine can be taken completely up the cut slope, so that the spoil bank is safely outside the area of washing or the discharge can be loaded into trucks at the back of the machine. It can be operated to provide the proper grade line of the ditch and all that is necessary to this end is to provide two stakes ahead, set by a level. The machine is equipped for night work and has been operating for some time on a high-speed main line of a large railroad, without interference with traffic.

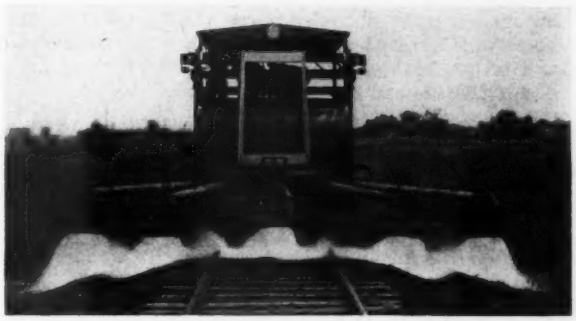


The Ditching Machine Saves the Labor of 35 Men and Does Not Interfere with Traffic

New and Improved Fairmont Weed Burners

FAIRMONT Railway Motors, Inc., Fairmont, Minn., has developed a new open-flame weed burner, the Class W55, Series A, which is self-propelled and provides a flexibility of controls which results in a maximum burning speed. This company has also placed on the market an improved small open flame weed burner, the Class W44, Series B, and has improved its oven-type weed burner, now designated as the M27, Series G.

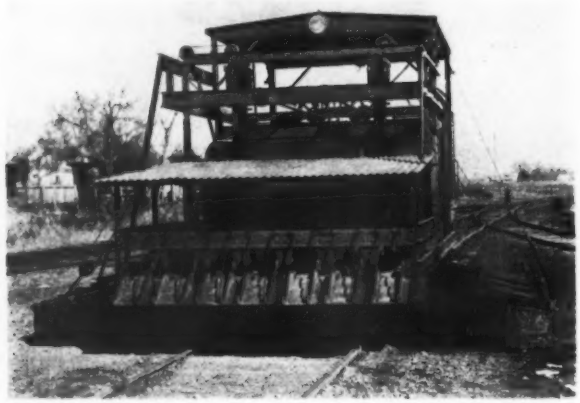
The Class W55, Series A, unit is equipped with five wide-flame burner heads which provide a burning width of 25 ft. in one trip and a maximum width of 32 ft. in two trips. The burners are said to produce an exceptionally hot flame and to need no adjustment when operating, because the proper proportions of air and oil are delivered automatically. The fuel oil system includes a transfer pump, a 1500-gal. tank, pressure pump, relief valve, pressure gage, pressure regulating valve, strainer, quick-acting valve and individual on-and-off valves, permitting each burner head to be turned on or off to suit operating conditions.



The New Class W55, Series A, Open-Flame Fairmont Weed Burner

Of the five burner heads, four are adjustable from the operator's platform while the fifth (center) is adjustable manually within limits for wind and working conditions. An igniter unit, which is attached to the center burner, is operated from the control deck and provides a means of lighting all burners. The unit is powered by one 72-hp. engine with a 4-speed transmission and separate reverse gear, while a 38-hp. governed engine drives the blower, fuel pressure pump and fuel transfer pump. Vacuum brakes assure safe and positive stops and a worm and gear park-

ing brake is also standard equipment. Axles are of 3½-in. steel, mounted on double row Timken bearings. The rear axle is spring loaded for good tracking at curves, switches and turnouts.



The Fairmont Oven-Type Weed Burner Has Been Improved in Several Respects

The W44, Series B, is an improved small open-flame burner, propelled by an A5 power car. Three new wide-flame, fixed passage burners are mounted at the rear on extension pipes. The two side burners are independently adjustable to suit operating conditions and are counterbalanced for ease of handling. The center head can be adjusted manually at its mounting, and is equipped with an igniter unit controlled from the operator's cab. The heads have air and oil passages of correct sizes for best combustion and a hot flame without the need for burner adjustments.

Power for the blower, fuel pressure pump and fuel transfer pump is furnished by a governor-controlled 36-hp. engine, and all controls, including those for stopping the engine and engaging the clutch, are located in the cab which is built of heat-resistant materials and equipped with fire glass windows. The fuel oil tank has a capacity of 640 gal., more than enough for a full day of work. Other standard features include a high velocity blower, self-lubricating fuel pressure pump, heavy-duty drive wheels, electric horn, front and rear lights, and a cab top with marker brackets.

The Fairmont oven-type weed burner has been improved in several respects during the past year and this unit is now designated as the M27, Series G. The oven has been redesigned with respect to the heat plates and method of suspension to provide longer life and better service. The nozzles have been improved to give longer life and better flame distribution, and a larger and more powerful nozzle is used at the side to obtain better burning beyond the tie ends. The counterbalances for the wide wings have been made automatically variable in three steps, depending on the angle of the wing, and a safety catch has been added for each wing to hold them firmly in the raised position. These catches can be released from the operator's deck. Dome and instrument panel lights have been added for night burning.

Improvements In Mall Chain Saws

THE MALL Tool Company, Chicago, has improved its gasoline engine-driven and air motor-driven chain saws, which are made in capacities of 24 in. and 36 in., providing a new automatic clutch and an automatic oiler and chain tension device. The saw chain has been improved also by making the guide plate narrower. This permits the saw to be removed from the cut, if necessary, more easily than formerly.

Above—The New Gasoline-Engine-Driven Chain Saw. Below—The Air Motor-Driven Chain Saw and Connection Hose.

The gasoline-engine-driven saw is powered by a five-hp., one-cylinder gasoline engine, while the air-driven saw is powered by a vane type air motor of either 3½ hp. or 5 hp., which consumes 90 cu. ft. and 133 cu. ft. of air respectively, at 90 lb. pressure. The gasoline-engine driven type of power unit is mounted at one end of the chain saw by a swivel arrangement, which permits the saw to be tilted without tilting the engine.

These saws make it possible to cut a tree, leaving a stump only 1½ in. high, which saves wood and also makes it possible to drive over the stump if necessary. Both saws are light in weight, are easily operated and are very compact. They are said to be made of quality materials throughout and to require no special tools for operation.

Allis-Chalmers Shovel and Compressor

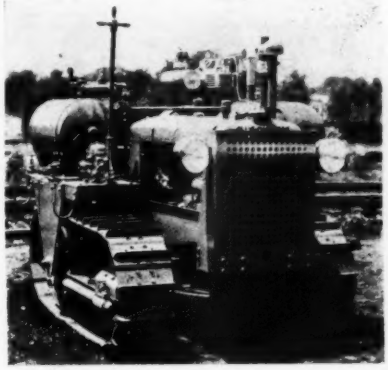
TWO improved machines for use in maintenance work have been placed on the market by the Allis-Chalmers Manufacturing Company, Milwaukee, Wis. They are the Hough model WMX cable-operated shovel and a Davey compressor. Both units are mounted on Allis-Chalmers tractors.

The cable-operated shovel was designed as a supplementary unit to the company's line of hydraulic shovels, and has been constructed with the same ruggedness and convenient operating features. It offers the latest design in drives, brake, and clutch construction, simplicity of operation and long life. Other features include completely enclosed brake and clutch, automatic ventilation and cooling, better drive comfort and visibility, and improved performance. The hoist drives from the front engine power take-off through enclosed bevel gear boxes and propeller shaft to a clutch and brake located above the engine. An automatic cable take-up prevents

The Hough WMX Cable-Operated Shovel

cable overwind, and a one-lever control raises, holds or lowers the bucket.

The Davey compressor is mounted on the Allis-Chalmers WM tractor

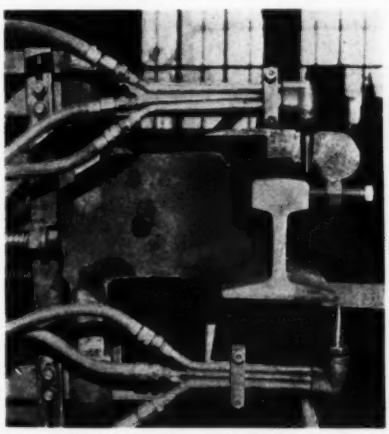


Allis-Chalmers WM Tractor Equipped with a Davey Compressor

and is available as a single or two-stage unit. It is capable of delivering 105 cu. ft. of air per min. at 725 r.p.m.

Portable Rail Cropping Machine

A PORTABLE rail-cropping machine for use in cropping the battered or badly corroded rail ends of relaying



The Portable Rail Cutting Machine, Showing a Completed Cut

rail in the field has been developed by the Air Reduction Sales Company, New York. The machine consists of two oxyacetylene cutting torches mounted on a frame which is operated by a hand screw to make two cuts simultaneously at any desired point on the rail, one torch cutting down through the ball and the other cutting upward through the base. Both cuts meet in a fairly smooth juncture in web of the rail.

This portable shop-built machine has been proven satisfactory in preliminary trials. It is being further improved for field operation. In its preliminary trial, test specimens were ground with emery across the web, showing no harmful thermal cracks.

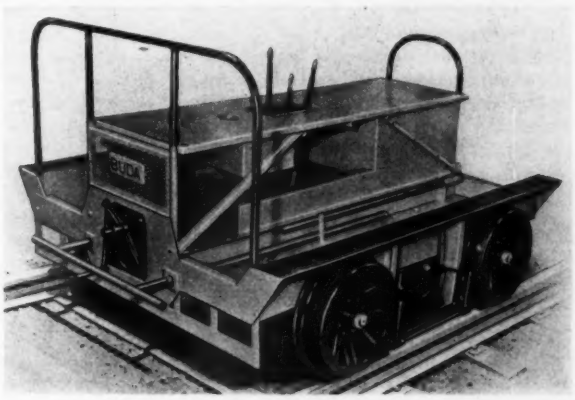
Improved Buda Motor Car

FEATURING demountable wheels and a two-speed drive, a new model, G-1, of the one to eight men motor car, known as the Section Master, has been placed on the market by the Buda Company, Harvey, Ill.

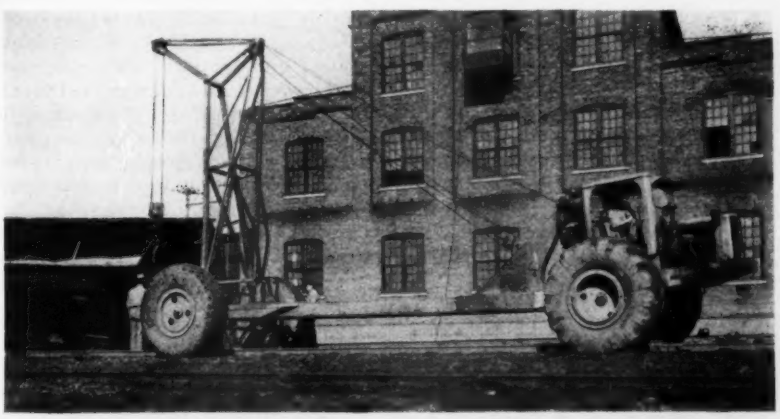
The demountable wheels of the Section Master offer a number of advantages, chief of which is the fact that, when worn out, they can be removed without disturbing the hub or incurring expensive shop changes. In addition, it is claimed that they are less expensive and permit substantial savings in material. At present the new wheels are furnished only on request, but they are expected to be made standard equipment in the future.

The two-speed drive has been developed and perfected as a means of providing a light-weight yet powerful section car which can be handled easily by a small crew and at the same time haul capacity tonnage from a standing start. This is brought about by the ability of the high gear to offer good track speed, while the low gear provides a maximum of load-pulling power. The new unit operates in both forward and reverse speeds. The two-speed drive is also available on request but is not yet standard equipment.

The Section Master is powered by a four-cycle, air-cooled engine capable of carrying a capacity crew and towing equipment trailers loaded up to 4,000 lb. without the two-speed reduction gear. It is ruggedly constructed with a welded, all-steel frame and has a safety feature of reinforced rail skids on the front end and on the sides between the wheels. The unit is equipped with four-wheel brakes. The car is easily lifted, requiring only 95-lb. rear lift for quick removal from the track. It is claimed that the unit offers a low gas and oil consumption and low maintenance. The drive is a friction cone type, ball-bearing mounted, with a chain drive to the axle.



The New Model G-1 Buda Section Master Has Several New Features



A 20-ft. Tournacrane Righting a Derailed Car of Gravel

What's the ANSWER?

Cleaning Pipe Lines and Sewers

Where the capacity of pipe lines or sewers has been decreased severely by deposits, what methods are available for cleaning them to avoid the use of critical materials?

Several Devices Available

By E. M. GRIME
Engineer of Water Service, Northern Pacific, St. Paul, Minn.

Several types of revolving mechanical devices, that are operated by hand or by power, are available for the cleaning of small sewers, up to 10 or 12 in. in diameter. As a rule, sewers are clogged by deposits of sand, mud or miscellaneous debris which is dropped when the velocity of the liquid decreases. This deposit is usually on the lower half of the pipe and, for sewers 18 in. and larger in diameter, if a piece of heavy chain to which a few pieces of scrap iron are attached, is dragged through the drain and plenty of water is passed through at the same time, it will be as effective as any other type of cleaner.

Under present war conditions, the cleaning of water pipes becomes of extreme importance and it seems desirable that every road make a careful check of its lines to determine where there is a greater pumping head than is warranted by the hydraulic conditions involved. Most of the deposits in these lines are calcium carbonates or other salts that cannot be removed entirely by the lime-soda ash treatment and are precipitated out in the line as a result of changes in temperature or variable pressure induced by the action of the pump. These deposits usually are uniform over the whole inner surface of the pipe.

There may also be interference with free flow through a pipe line by corrosion nodules which form at frequent intervals as a result of acid water, which attacks the metal. A 6-in. line only 1,500 ft, long, conveying a comparatively soft river water but one having a sufficiently low pH to be on the acid side, was found to be reduced ¼ to ¾ in. in radius by the formation of corrosion nodules and other products of corrosion and when this accumulation was removed, the pipeline capacity was increased approximately 50 per cent. In this instance, the purchase of a larger pump, which had been considered, was found to be unnecessary.

If inspection of the work is not followed rigidly during the construction of pipe lines, it happens frequently that stones, pieces of wood, tools, lead or other debris may be left in the line and thereafter become a serious obstruction to free flow of the water. Recently, a case occurred in which the cleaning instrument became lodged in a 6-in. pipe, and investigation disclosed a 38-lb. chunk of lead. Apparently, when the pipe was laid there was a joint where the oakum ring did not close or was not set properly, and four ladles of lead were poured into the pipe before the mistake was noticed. Four distinct layers of lead totaling 1 15/16 in. thick by 20 in. long were found at this point and two other large chunks at other places. After they were removed and the entire line was cleaned, a pumping test showed the water production to increase from 318 to 435 g.p.m., or 36 per cent. This loss had not attracted attention until a shortage of water resulting from greatly increased traffic made it evident that a larger pipe

Send your answers to any of the questions to the What's the Answer Editor. He will welcome also any questions you wish to have discussed.

To Be Answered In May

1. To what extent is it practicable to double-shift power machines engaged in maintenance of way work? Does the type of machine or the character of the work make any difference? What are the advantages? The disadvantages?

2. What non-critical materials can be substituted for critical materials in the maintenance of shops and enginehouses? What are the advantages? The disadvantages?

3. In view of the present shortage of replacement rails, is it practical to apply joint bars to broken rails for an indefinite period? What types of breaks?

4. To reduce the consumption of critical materials, what substitutes can be employed for cast-iron and reinforced-concrete pipe in culverts? To what extent? What are the advantages? The disadvantages?

5. What is the average life of a motor-car spark plug? How long should it last? What can be done to prolong its life? How can it be reconditioned?

6. Where the delivery of water to locomotives must be speeded up, what provision should be made to overcome the hazard of water hammer? What is the alternative?

7. In what ways can slow orders be eliminated and delays to trains avoided when doing out-of-face surfacing? What precautions are necessary?

8. To what extent can foremen conserve materials through closer supervision of outfit tool and supply cars?

line or improved facilities were required to maintain the supply, but which the cleaning work made unnecessary. In another case, the cleaning of a 10-in. pipe at a cost of 20 cents a foot increased the flow from 14,000 to 20,500 gal. per hour and made unnecessary the construction of an additional storage tank that had been contemplated.

Where pipe lines contain many short runs and abrupt turns and the incrusting material is calcium carbonate from lime—soda ash treatment, the cleaning may be done effectively by circulating hydrochloric acid through the line until the incrustation is dissolved. The usual method of cleaning is by using either a high-speed revolving mechanical tool which removes practically every vestige of incrusting material, leaving the pipe as clean as when new, or a pressure tool and wire brushes, which are moved forward through the line by the pressure of water behind it. This method is rapid if a high water pressure is available and no obstructions are encountered, but results are usually more certain with the revolving tool, especially if the line has not been cleaned previously, and large obstructions may be encountered.

At this time, when it has become very difficult, and sometimes impossible, to obtain pipe, pumps, motors and some storage-tank materials, it is extremely important to determine whether pipe-line cleaning will give adequate relief in certain cases of congestion and thereby conserve both labor and critical materials.

Must Be Agitated

By Supervisor of Water Service

It is a relatively simple matter to introduce cleaning equipment into a sewer by means of rods especially designed for this purpose. One of the essentials in cleaning a sewer, however, is that there shall be ample water to carry away all material that may be loosened during the cleaning process. An essential for loosening this material is that there shall be continual agitation. There are several devices by which the cleaning can be accomplished, but where the material in the sewer is soft or loose, almost anything that will keep it agitated while a considerable stream of water is poured into the sewer by means of a hose, will do the cleaning satisfactorily. This includes a chain or a rope to which scrap iron, bricks or other heavy chunks are fastened.

Special tools are available for cleaning the interior of pipe lines, the most satisfactory of which is a tool that just fits into the pipe and is rotated by means of a turbine which is a part of the tool, and which is actuated by water under pressure behind it. The stream of water which passes through the turbine carries away the fine particles that are dislodged by the rotating cutting edge.

Recently, a method of surging hydrochloric acid or other chemical, depending on the composition of the incrustation, has been employed with satisfactory results and is growing in favor. One advantage of this method is that sharp bends offer no obstruction to the cleaning process.

Reducing Critical Materials

In what ways can the use of critical materials in track maintenance be reduced? What materials?

First, Apply Properly

By F. R. Layng
Chief Engineer, Bessemer & Lake Erie, Greenville, Pa.

Rail, joint bars, bolts, spring washers, tie plates, spikes, frog and switch material, switch stands, track tools, track cars and other iron and steel parts of equipment used in track maintenance, and even cross and switch ties are classed as critical materials.

In general, the first step to reduce the use of such materials is to apply them properly, to insure that in use they will not be abused by reason of improper application. The second step is to surround them with all known methods of protection to insure longer life; while the third step is to adopt methods that will, so far as possible, restore worn materials to usable condition so that they may be continued in service.

All too frequently, by neglecting essential details, new materials are applied in the track in such a way that their maximum useful life is not realized. For instance, when new rail is laid, it should be laid accurately to gage; the ties should be adzed properly, preferably with power adzers; all holes in the ties should be plugged; attention should be given to the application of joint bars to insure that they fit, sufficient anti-creepers should be applied and careful attention should be given to expansion. When replacing worn frogs and switches, care should be exercised to see that new materials are not applied adjacent to worn materials. In general, the best way to get full use of new materials is to apply them in a workmanlike and substantial manner.

After new materials have been applied, every effort should be made to prolong their usefulness. For instance, with new rail, constant attention is necessary to see that anti-creepers are functioning, to maintain correct bolt tension and to maintain the track to the highest standard of line and surface. The placing of rail and flange lubricators on curves, the lubrication of switch points and many other practices that tend to prolong useful life are advisable.

Reconditioning worn materials is an important item, especially by methods that do not require their removal from the track. An illustration is the building up of rail ends by welding, while the reconditioning of worn joint bars and the restoration of worn switch points and worn frogs by welding are others. Tools, track cars and power machines used in track maintenance should be kept in repair and protected from the weather, so far as possible, and lubrication should be given special attention. It is believed that by following the practices outlined, a substantial reduction can be made in the new materials that would otherwise be required.

Cannot Substitute

By F. G. Campbell
Assistant Chief Engineer, Elgin, Joliet & Eastern, Joliet, Ill.

This question naturally brings to mind the possibility of making substitutions for critical materials. To a large extent this is impossible in track maintenance, since steel is the critical material that is used most widely and there is no substitute for steel in rail, rail fastenings and switch material. Some steel can be saved through the use of continuous welded rail, thus saving joint fastenings. Again, the substitution of short for long joint bars will save some material. These savings in themselves are comparatively small, although for all the roads,

the aggregate may be considerable.

It seems apparent, therefore, that the problem resolves itself more largely into making the materials we have last longer. The problem then divides itself naturally into two parts: first, through repairs and sufferance to allow the material now in the track to serve beyond the time of its logical and economical replacement; second, the rehabilitation of materials that have become unserviceable through use, and which would ordinarily be scrapped.

Making materials last longer in their present service is a problem for engineers of maintenance, division engineers and roadmasters, rather than for foremen. Its solution must depend upon more frequent and detailed inspection by these officers than is called for under normal conditions. Often, considerable stretches of rail that would ordinarily be included in the rail-renewal program can be carried over safely for another year, without necessitating slow orders or other interference with traffic.

Such action will probably be inconvenient and will result in increased average cost of rail renewals, but it will reduce immediate steel requirements. Similarly, spot renewals and repairs of switch materials in yards may be substituted for a more economical and expeditious program of out-of-face renewals of entire leads or other facilities. Obviously, decisions respecting such major changes in methods of carrying on work must be deferred until immediately before the work is actually required. Equally obviously, this necessitates more frequent and intensive inspections by supervisory officers.

Rehabilitation of materials has been discussed widely during the last two years, and I believe that this phase of conservation has been handled ably by the railways as a whole. On the other hand, there is little doubt that it can be carried further. The development of welding and welding processes has been of the greatest aid in making scrap materials available for reuse. While a discussion of what can be done with the welding torch will be out of place here, suffice to say that many of the things all of us have done during the last year in the rebuilding of frogs, crossings, switches and other track materials would have seemed utterly absurd three years ago, but we probably can and will carry these absurdities still further during the year.

Welding Driver-Burned Rails

In view of the extreme need for rail, is it permissible at this time to repair driver-burned rail by welding and keep the rail in service? Under what conditions? What precautions, if any, should be observed?

Favors the Practice

By C. H. R. Howe
Cost Engineer, Chesapeake & Ohio, Richmond, Va.

It is difficult for anyone who has had the opportunity of reviewing the successful results obtained in many thousands of cases of built-up driver burns, to understand why there should be any question about the necessity for such work. The fact that not a single failure occurred in any of these cases speaks for itself.

While it is probably true that the average railway maintenance engineer has never made a serious study of metallography and would be inclined to think that such knowledge is essential to an understanding of what happens to rail steel when the wheel burn is repaired, such is not the case, for from a practical viewpoint the process is one that is governed by simple physical laws. Basically, welding is the art of heating both parent metal and welding rod to a temperature high enough to permit the two to fuse together, without materially altering the chemical or physical structure of the object to be welded.

It is axiomatic that to raise a definite volume of metal to a definite temperature, a definite number of units of heat must be applied. When heat is applied, it is conducted from the point of application to the surrounding metal and penetrates it in gradually reduced intensity until the induction or heat-absorbing volume of the metal neutralizes the effect.

While it is true that wheel burns vary in area and depth, it may be said that the superficial area of a burn caused by a given driver with a given duration of spin, will be approximately the same regardless of the weight of the rail, and that the same amount of metal will have to be applied to restore the section. This being the case, the same number of heat units will be required in the welding operation. Therein lies the difference in welding light and heavy rail.

When examination is made on the center line of a properly-executed weld on a wheel burn on a 131-lb. rail, it will be found that the hardness of the surface of the weld is about the same as that of the cold-rolled surface surrounding it. The degree of hardness decreases the farther below the surface the test is made, until at a point approximately 1⅜ in. below the surface, the hardness is normal for that particular rail, and photo-mechrographs will show that the grain structure of the rail below this point has not been disturbed.

Rebuilding wheel burns on lighter rail requires more serious consideration, particularly for sections 100 lb. or less. The reason for this is that there is less volume in the head to absorb the heat; consequently it penetrates to a greater depth, possibly entering the web to such a degree as to cause serious damage to the grain structure of the steel. Work of this nature should be undertaken only after extensive experiments and tests have been made, and in the case of building up burns on rail of any weight, precautions should be taken to avoid overheating.

What Size and Depth?

By C. B. Bronson
Inspecting Engineer, New York Central System, New York

Assuming that the policy of repairing driver burns is justified, the practical question is, what spots should be built up. Should this include all or be confined to shelled-out spots; if the latter, of what size and depth? Based on general observation, to build up all slipped spots would be a sizeable task, to say the least. In other words, there should be some sort of a yard stick to govern field men in deciding what to repair. To the best of my knowledge, decisions are based more on personal observations and judgment than on any set rule.

Again, will repair by welding be entirely corrective? It is well known that the worst slips occur around turnouts at passing sidings, at stations, near signals, at water columns and at other places where trains are stopped. When slipping occurs the spots are in multiples, corresponding with the number of drivers, and may be on one pair of rails or on several. Subsequently, other trains may slip on the same or adjacent rails, burning another set of spots. Repairing such rails then becomes more or less of a hopeless proposition, but after all they

are the rails most in need of repair. Replacing burned rails with new or released rails does not help, for the latter may be burned in the same way in a relatively short time. Continuing educational campaigns for enginemen to eliminate the cause should be an effective action.

Even more important, may not the repairing lead to subsequent failure? Intense and rapid application of heat to the cold rail head causes intense hardness, and checking or the development of fine hair cracks occurs frequently within or below the shelled-out spot in that type of burn. Fast heating by the torch may widen and deepen these checks. The welded metal is merely a veneer over the cracked metal beneath and may lead to failure. It is understood that some roads have experienced such failures, though the number or extent is not known. Again, detector cars are finding more incipient failures as a result of driver burns, indicating the need for caution in building them up.

It may be argued that since rail-end welding is being practiced freely and successfully, it will be as successful when applied to burns in the body of the rail. The difficulty here lies in the fact that the stresses set up are three dimensional or constrained by the volume of metal surrounding the weld in all directions. Again, we are dealing with that portion of the rail head that is subjected to the most intense loading and in the zone of highest shearing stresses.

No doubt, preheating and post heating will help to relieve the internal stresses from welding at and surrounding these burned spots, but they will not eliminate any checks or cracks which have formed in the metal beneath from the action of the slipping tires. It will be the part of wisdom, therefore, to proceed cautiously on this type of repair work until studies now being made shed more light on the subject, even though various claims have been made as to its effectiveness and dependability.

How to Collect Scrap Currently

At a time when scrap is needed so urgently, what special measures can be instituted to insure that scrap on the right of way is collected currently. How often should it be shipped? Who should be responsible?

Keep It Picked Up Daily

By C. R. Schoenfield
Roadmaster, Chicago, Burlington & Quincy, Aurora, Ill.

The collection of scrap is always given close attention on a well-maintained railway, for three reasons: first, because it is not safe to allow scrap to lie around; second, it represents considerable money; and third, scattered scrap indicates lax housekeeping and indifferent supervision. It has always been our practice to keep our scrap cleaned up. As with other work, however, the cost of making the collection has always been kept in mind and we endeavor to clean up the scrap along with other work.

To set up assigned days to clean up scrap not only increases the cost of handling but consumes too many man-hours. In the past the consideration was mainly cost; today it is man-power. There has never been a time on the railways when it was more important that every employee make every move count by doing what he can to help others by using his hands, instead of using a pencil to tell someone else to get things done.

Every one can help in this way by picking up every piece of scrap when he sees it. There are places provided for the accumulation of scrap, and if there are not, it can at least be moved to a place where it is safe, and in this way prevent a personal injury and save a number of man days.

Make Collection Easy

By E. L. Banion
Roadmaster, Atchison, Topeka & Santa Fe, Topeka, Kans.

Scrap accumulates from many sources on a railway. Ordinarily it is looked upon merely as a source of revenue; today it is vital to boost the dwindling stock of scrap that is needed so urgently in war industry. Besides these important reasons for picking up scrap, if it is allowed to lie around it becomes a hazard of personal injury and may contribute to acts of sabotage. In the recovery of scrap, the salvage value of facilities in disuse is frequently overlooked. Structures that are no longer worth repairing or that do not meet the needs of today's operating methods actually represent so much scrap on the right of way, and may contain considerable reclaimable material.

Owing to the scarcity of the materials needed in maintenance, it has been found necessary to recondition for reuse many items that were formerly classified as scrap. This can best be done by sending all scrap to a central point where it is sorted, classified and, where possible, restored to further service. To insure maximum recovery of scrap along the right of way, an easy method of collection must be established. In the past, much scrap was lost because it was easier to toss it into the weeds than to load it. This was appreciated more readily when scrap tonnage increased after a magnet was employed for making the collections.

Collections from the right of way should be made daily. Gangs should also take scrap resulting from their work to the collection bin daily, instead of allowing it to accumulate until the job is finished. Section gangs should pick up daily all scrap and car parts that have fallen from trains. Ordinarily, a schedule of bi-monthly or quarterly shipments to the central point will be sufficient, and will insure full loading of the scrap cars. A crane equipped with a magnet and mounted on a flat car is the most economical means for collecting small track scrap, scrap rail, frogs, switches and the heavier car and locomotive scrap. Where quarterly or bi-monthly deliveries of supplies are made by the stores department, a system of loading scrap with the crane may be worked out in connection with the supply train.

Section men are charged with the responsibility for policing the right of way and collecting scrap, but men in other departments will assist in this effort by taking the scrap recovered in their work to the headquarters scrap bin. It is the responsibility of supervisory officers to see that storage facilities are provided for accumulating the scrap at gang headquarters and then see that it is disposed of at regular intervals.

Do Not Delay

By W. H. Sparks
General Inspector of Track, Chesapeake & Ohio, Russell, Ky.

There should be no delay in picking up scrap. Every section gang should pick up the obvious scrap daily and take it to headquarters. It will also be profitable to go over the section from end to end from time to time, searching for what is not so readily seen. Then, when the right of way has been cut and burned, it will be

worth-while to spread out for a fence-to-fence search. Scrap so accumulated should be piled along the track so that it can be loaded and taken to section headquarters. Large gangs, such as rail gangs, should clean up their scrap currently, shipping it direct to the stores department. The collections by the section forces should be taken to the tool house for loading when the scrap car runs over the district. The division engineer, the roadmaster or supervisor and the foreman are jointly responsible, each for his own territory, and in accordance with their respective authorities.

Section or Extra Gangs?

In view of the shortage of labor, what are the relative advantages and disadvantages of section and extra gangs for routine surfacing? How should they be equipped?

Older Men on Sections

By O. H. Carpenter
General Roadmaster, Union Pacific, Pocatello, Idaho

For ordinary spotting and smoothing of the track, I prefer to use section gangs, for several reasons. Spotting can then be done on all sections simultaneously, without waiting for the arrival of an extra gang. Spot surfacing is an exacting job, and if too many men are in the gang, there will be less detailed supervision over the work and some poor work will be done. Section foremen are assigned permanently to a section and have more or less pride in the riding qualities of their sections. They will see, therefore, that a better job is done than most extra gang foremen will on this kind of work, because the latter are more interested in the quantity than in the quality and durability of the work they do.

Almost all of the older track employees remaining are now on sections, while most of the men in extra gangs are inexperienced, so that the section men do better work and more of it. A great amount of ordinary spotting consists of short stretches at various places on the section. Any spot that does not require much time or many men to fix it, will represent considerable lost time if an extra gang and its equipment must be moved to take care of it.

Section men labor under the disadvantage that they are called away frequently to do a wide variety of other work. Now that all departments are short of men, and many tasks that were formerly performed by other departments must now be done by section men, the section gangs have less time to work on the track.

Ordinary hand tools designed for surfacing are all that is needed. Power tools are not well suited for spot surfacing in the first place, with one or two exceptions, while few roads have sufficient power equipment to provide section gangs with them. In addition, because of the many interruptions they experience, sufficient use cannot be made of the equipment to justify the assignment.

If the job requires flag protection it is out of the question to do it with section forces, for they cannot make enough progress in a day to justify the expense and the delay to trains, except in special cases where section gangs can be bunched temporarily. However, bunching is not successful if it lasts for more than three or four days, for the routine jobs on the sections from which the gangs are taken will suffer and the spotting and smoothing of track on all sections will be neglected. In view of the present shortage of man-power, this work cannot be caught up with readily when neglected even temporarily. Transporting section gangs for long distances to and from work each day not only wastes constructive time, but delays the starting of the work and shortens the day at both ends, for the visiting gangs must quit early to reach their homes. It also adds to the hazard of motor-car accidents.

If the work is beyond the scope of a section gang, I would use an extra gang. Here is where the most successful use of power equipment can be made, since the work can be carried on without interference by other duties, and enough men can be employed to justify the delays to trains caused by flagging and slow orders.

Not a Periodical Job

By J. B. Kelly
General Roadmaster, Minneapolis, St. Paul & Saulte Ste. Marie, Stevens Point, Wis.

Spot surfacing is not a periodical job, but must be done by continual, relentless effort to keep the track in smooth shape. The section gang has this advantage, therefore, that it has an allotted jurisdiction and is available at all times to cope with this important requirement for smooth track. In general, the results it produces are better than those produced by other organizations. On the other hand, the mileage produced by an extra gang in making the original improvement is of great value when the section crews are utilized later to keep the work up to the standard.

What may be needed in this period of labor shortage and high speed, with more traffic and a high percentage of maximum wheel loading, is a change in the methods of surfacing track. In the conventional practices, the organizations cover only a part of their assignment annually, leaving considerable track without surfacing, which is reflected in damage to the track structure and to the rolling stock, and which tends to involve traffic. Troweling, as described on page 110 in the February issue, has been very beneficial on a few roads where it has been followed in accordance with prescribed rules and under detailed supervision. With this method from five to ten times as much track can be completed as by the conventional method of surfacing, and it seems that this is at least a partial answer to the man-power shortage problem.

Both Have Advantages

By G. Stafford
Section Foreman, Canadian National, Redland, Alta.

Advantages and disadvantages are inherent in both the section and the extra gang when used for routine surfacing. By reason of its size, its ability to use mechanized equipment, its freedom from patrol duty and its immunity to interruptions to perform miscellaneous work, the output of the extra gang in work per man-hour is far in excess of the section gang. Its work is also under the constant supervision of the foreman, and because of the specific nature of their work and constant application to it, the men are adept at carrying out their tasks. A further factor is the wage differential that exists in favor of the extra gang on many roads.

There are also certain disadvantages. Extra gangs must be provided with boarding and sleeping cars, and tool and equipment cars, which, as the work progresses, must be moved by train from time to time. At the outset the gang is composed largely of inexperienced itinerant laborers, and until they gain experience the quality and quantity of their work leaves much to be desired.

Smoothing track has always been a

prime responsibility of the section forces. As they spend about 60 per cent of their time on the track at surfacing, they become proficient in making light lifts, such as extra gangs are unaccustomed to, and are highly productive in this class of work whether performed by hand or with mechanical equipment. Section gangs will have their productive capacity increased if they are equipped with tie tampers of the unit type.

Precautions for Safety

On roads that have lowered physical standards and age limits, what precautions should foremen of bridge and building gangs observe with respect to the safety of their men, that have not been necessary heretofore?

One of Many Problems

By P. F. Buckle
Superintendent of Safety, Chicago, Burlington & Quincy, Chicago

This question touches on one of the many problems confronting us today and there have been many discussions concerning the additional precautions to be taken by supervisory officers to afford maximum protection to employees and particularly to new employees. Because of the widened age limits for new employees, as well as the lowering of physical requirements, it is my belief that the foremen will have to provide a greater margin of safety for new employees than is necessary with older, more experienced employees, because the new men are not familiar with the correct procedure in cases of emergency. In other words, because of their inexperience, they have not acquired the knack of doing the right thing at the right time. This means that the foremen will have the added responsibility of, more or less, doing their thinking for them. In line with this, I believe that before starting work each day the foremen should instruct their men as to the safe and proper way to perform their assignments for the day.

It will also be necessary for the foreman to call the attention of all of his men, and more particularly of the new men, to safety bulletins and posters, so that they may derive the maximum benefit from them. New men, especially should be impressed with the importance of reading and complying with all safety rules, as well as all other rules governing the performance of their duties.

Covers Three Groups

By Engineer of Bridges

Where there has been an increase in the spread between the upper and lower age limits, and a relaxation of physical requirements, this question touches three distinct groups, namely: (a) youths who are not eligible for military service, but are physically fit for work; (b) men physically fit, but beyond the normal age limit for employment; and (c) those between these two groups who would not ordinarily be employed because of physical deficiencies or for other reasons.

It is readily apparent that we are concerned primarily with groups (a) and (b). The impetuous, quick-thinking, quick-acting youth must work with older men who are experienced in the work to be done. They should be worked in slowly and, while this is being done, they should be (1) directed carefully and explicitly regarding each move to be made; (2) given careful instructions and practice in the use of each tool or machine being used; (3) given a thorough explanation of the meaning and application of each safety rule, coupled with actual demonstration of the working of each rule; (4) encouraged to a personal understanding and practice of each safety rule. In addition, the regular members of the gang should (5) be encouraged to be especially careful of their own actions, to set a good example, and to be observant of the actions of youth to correct at once bad practices which lead to accidents if not corrected. Again, (6) some consideration should be given to the class of work to be assigned to the younger employees.

Foremen and leaders must be specially observant to insure that the youth does not take for granted that older employees comply in all respects to safety rules. A case in point is that of the youth who, after his first serious accident, said that "we younger fellows watch the older men and do as they do." I believe that it is especially effective to capitalize on accidents to youths by making the injured one a safety ambassador, as it were, and to insist, as a part of the discipline, that he check up on the tools, appliances or practices in other gangs, in respect to the circumstances surrounding his own accident.

It is just as necessary that the over-age employee receive special instruction as it is that the under-age one does. To this end, (1) greater care should be exercised in selecting the kind of work assigned to the older men; (2) they should be kept on the ground or close to it, or on a safe working platform; (3) extra precautions should be exercised when it becomes necessary to work them on ladders, staging or high platforms, and particularly to see that every safeguard is provided to insure against accidents; (4) it is important to know that safety rules are understood and practiced at all times; and (5) regular crew members should be encouraged to be especially alert and careful, lest they commit an unsafe act or set a bad example that will lead to accidents.

Effects of Shortage of Timbers

What effects do the present shortage in desirable grades of construction timbers have on the requirements for preframing and treatment? Why? To what extent?

Learns New Values

By L. G. Byrd
Supervisor of Bridges and Buildings, Missouri Pacific, Poplar Bluff, Mo.

Many supervisory officers are just beginning to realize the disadvantages and the slowing up of progress in the renewal of heavy structures that are resulting from inability to secure the grades of construction timbers formerly used in open and ballast-deck trestles, as well as in the decks on steel spans. At present, we are not able to complete heavy structures because we are short of and cannot obtain the material required to do so. For this reason, in many cases we are carrying out only a part of the renewals scheduled for these structures. In some instances we are driving piles and installing temporary caps of such materials as are available, to strengthen the bridges until the needed materials are again obtainable.

This lesson will have a decided effect on the viewpoint of many who have not in the past appreciated the value of second-hand materials released from both bridges and buildings. Large quantities of good, first-class second-hand material have been removed from structures and consigned to fires, when they should have been salvaged, reframed to dimensions that could be obtained from them, and then given preservative treatment. For example, released stringers 24 to 26 ft. long can easily be worked into shorter lengths or other dimensions. We have recently constructed several small buildings in which 85 per cent of the material was reclaimed from other structures. Sway bracing salvaged in short lengths can be remilled into various dimensions at low cost with modern wood-working tools and equipment.

In fact, there are few pieces of framed material released from heavy structures which cannot be salvaged in some part. The shortage of desirable grades of construction timbers will be the cause of delaying the renewal of bridges out of face. In many cases the structures will have to be carried in their present form for longer periods by driving and capping temporary helper bents.

Must Use What Is on Hand

By Paul L. Zepp
Transitman, Baltimore & Ohio, Punxsutawney, Pa.

Preframing can be done most economically when the minimum amount of cutting is necessary. To minimize framing, it is necessary to have on hand sufficient sizes of timbers to meet all demands. In times of shortage, this cannot be done, and the mill foreman must select larger pieces of timber and cut them down to the sizes required.

Waste can be lessened somewhat and orders can sometimes be filled if the order states the purpose for which the timber is to be used, so that other sizes or grades can be substituted. There seems to be no reason why lower grades of structural timbers cannot be substituted for the better grades where the strength of the timber is not important. If this is done, however, the decrease in strength must be taken into consideration. In other words it may be necessary to increase the size of the timber to offset the lower stress value.

During the period when stress timbers could not be obtained by reason of WPB orders, we were able to purchase only the grade known as square edge, which is of unknown but variable stress value. This had an unfavorable effect on preframing and treatment because many of the applications for which this grade is suitable do not warrant the cost of treatment, and this incidentally eliminated preframing. Furthermore, some of the characteristics that place lumber and construction timbers in the lower grades affect treatment, for the presence of bark and knots makes penetration difficult, while checks and splits allow the preservative to penetrate the timber extensively. Again, unseasoned timber is highly resistant to treatment, because the cells are filled with water.

Emergency Stocks of Materials

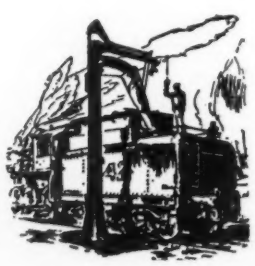
To insure quick restoration of bridges or buildings damaged by sabotage or other enemy action, should emergency stocks of materials be increased? To what extent? Should additional points be established for holding emergency stocks? Why?

All Difficult to Obtain

By Supervisor of Bridges and Buildings

In considering this question, it should be borne in mind that today emergency supplies are practically unobtainable from outside sources, at least in time to be of any benefit after the emergency arises. For this reason, the railway must have on hand before the emergency any material that it is likely to need to repair damage created by enemy action, as well as by other forces. This means that preparation must be started long in advance of the event and that where there is a probability, or even a possibility, of damage to structures through enemy action, good sense dictates the desirability of stocks at strategic points.

Whether the stocks now considered sufficient should be increased to protect against this added danger, will depend on the degree of the hazard that is considered to exist, the importance of the structures that are to be protected, the type of construction involved, the purpose for which the structures are used and the difficulties involved in bringing the materials from stocks farther away than those now maintained for emergency purposes. Two questions should be considered—first, that the really hazardous areas comprise only a small part of the mileage of the railways in this country; and, second, the effect of delays in completing repairs.



More careful preparation is desirable as the hazard increases, and as it increases the more desirable it becomes to decentralize the emergency stocks to prevent complete destruction as a result of a single attempt. Obviously, decentralization will entail some increase in the quantity of the emergency material to be provided, since it is quite likely to involve considerable duplication of items.

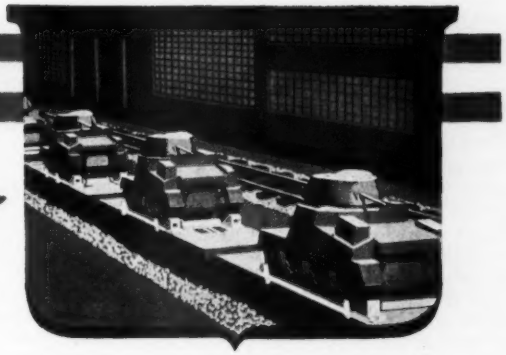
Better Be Prepared

By General Inspector of Buildings

Obviously, if there is likelihood of either sabotage or other damage to structures by reason of enemy action, or from any other source for that matter, preparation should be made to get repairs started at the earliest possible moment and to carry them to completion as rapidly as practicable, particularly if the loss of the structures will interfere with the movement of traffic, as would be the case with a bridge, a freight house or a pier. One of the best assurances that repairs will be advanced quickly is to have an ample supply of materials, not only available, but close at hand where it can be drawn on quickly when the emergency arises.

This does not mean that large stocks should be accumulated, beyond a liberal probability of what will be needed or can be used. In a disaster such as the question envisions there will be more or less confusion. For this reason, the stocks should be well organized and every item listed. Several copies of this list should be made and placed in the hands of responsible employees who will be connected with the repair operation. Generally, in a danger zone, stocks should be maintained at several strategic points, and independent lists should be made of the consist of each stock.

NEWS of the Month



Reports Large Increase in Rail Troop Movements

More than three times as many troops were carried by American railroads during the first half of January as in the corresponding period of 1942, according to a recent statement of Major-General Charles P. Gross, chief of the Army Transportation Corps, who reported that troop movements had increased to the point where approximately 1,750,000 men are now being transported monthly by the railroads in organized parties. He explained that this total does not include those traveling as individuals or in parties of less than 50.

January Employment 12.96 Per Cent Above 1942

Although railroad employment decreased 0.14 per cent, from 1,320,910 to 1,319,114, during the period from mid-December to mid-January, the January total was still 12.96 per cent above the comparable 1942 figure, according to the Interstate Commerce Commission. January employment in four of the seven employee groups was under December, the group embracing maintenance of way and structures group being down 1.07 per cent. All groups were above January, 1942, the largest increase being the 27.25 per cent rise in the maintenance of way and structures group.

Last Year's N.O.I. was $1,481 Million

Showing an increase of 48.3 per cent over 1941, Class I railroads last year had a net railway operating income of $1,480,940,760, according to the Interstate Commerce Commission's Bureau of Transport Economics and Statistics. This is equivalent to a return of 5.56 per cent on property investment, according to the Association of American Railroads.

Shortly after the summary was made public, the I. C. C. Bureau issued its monthly Comment on Transportation Statistics in which, following considerable discussion, the 1942 net income after fixed charges was estimated at $960,000,000—a figure "surpassing all previous records, the nearest being that for 1929, which was $898,806,611."

ODT May Establish Rail Freight Priorities

Because of a shortage of open top freight cars and locomotives which threatens to cause serious delays in the delivery of bulk commodities by railroads, the Office of Defense Transportation announced on February 23 that it may become necessary to establish a system of rail freight priorities this year in an effort to "protect production and movement of essential products."

The statement was issued following the completion of a survey of the transportation outlook which indicated dissatisfaction of ODT officials with the War Production Board authorization of railroad equipment deliveries for 1943. The report stated that WPB has authorized deliveries of only 250 steam and 36 Diesel locomotives for road freight service in the first eight months of 1943, and 100 Diesel switch engines and 17,388 new hopper and gondola cars in the first six months of the year.

If additional equipment is not authorized, and if other measures do not relieve the motive power and car situation, priorities may be inaugurated, ODT intimated.

Railroads Plan Record Oil Movement

That 900,000 barrels of oil daily would soon be moving to the Atlantic coast area was predicted by John J. Pelley, president of the Association of American Railroads, testifying before a Senate committee on January 27.

In his testimony, Mr. Pelley pointed out that the factor controlling the ultimate capacity of the railroads to move oil still is the locomotive supply and stated that the best information at the present time is that railroads will get about 600 new locomotives this year, though they asked the War Production to approve the allotment of materials for 878.

In discussing the increase of oil shipments to the East, Mr. Pelley revealed that by using 200,000 metal drums loaned for this purpose by the Army and 500,000 new metal drums now being manufactured for shipments in box cars, the railroad's capacity to handle oil into the East coast region will be increased within 30 days by an average of 20,000 barrels a day.

In addition to this increase, a recent survey of unloading facilities in the East indicated that expansion and improvements under way will add about 25,000 barrels a day to railroad capacity by speeding the release of tank cars.

He added that the pipeline ending at Norris City, Ill., will soon be moving about 130,000 barrels a day to that point, which will increase the daily delivery of oil by tank car to the East by about 43,000 barrels a day by shortening the round trip of a large number of cars now running into the southwestern oil fields. Release of a considerable number of tank cars by substituting highway vehicles on short hauls will add another 20,000 barrels a day to the average delivered by rail to the coast. These measures altogether will add about 108,000 barrels a day to the railroads' deliveries, Mr. Pelley said, and other contributing factors, such as faster movement of empty tank cars, will help them attain the 900,000 barrels a day average.

Agree on Manpower Program

A 13-point program, designed to bring about "alleviation of manpower problems in the railroad industry" was agreed upon in the form of a "statement of principles" by spokesmen for the regional railroad executives' associations and railway labor organizations at a conference on January 29. The program favors leaving to individual managements and system labor organization representatives the task of carrying out "each step by agreement." The 13-point program, as set forth in the ODT announcement, follows:

1. Relaxation of yard operating rules to permit crews delivering cars to the yards or tracks of another road to haul back cars to their own road, so as to give the engine a load in both directions.
2. Continued employment, as long as physically able, of men eligible for retirement under the Railroad Retirement Act.
3. Cooperation of management and workers to reduce absenteeism to a minimum.
4. Relaxation of road mileage limitations and of hourly limitations in yard service.
5. Efforts by labor and management to work present forces full straight time and to distribute uniformly such overtime as may be required.
6. Upgrading and promotion within or without any group, seniority being retained in the original group, so as to bring about fullest possible utilization of training and skills of present employees and minimize problems of obtaining and inducting new employees.
7. Transfer of shop work from one railroad to another to meet critical labor shortages. Transfer of employees from one railroad to another, with preservation of seniority rights on original job.
8. More intensive on- and off-job training, and provision for some pre-employment training. Consideration of payment of compensation during pre-employment training periods.
9. Cooperative effort to encourage return of retired employees.
10. Relaxation, so far as practicable, of age and physical examination requirements.
11. Induction of new employees, so far as practicable, into lower skilled brackets so as to minimize the need for pre-employment training and to expedite on-the-job training.
12. Consideration of employment of women of railroad employee's families.
13. Relaxation of the present 16- to 21-year age limits for employment of shop craft apprentices, so as to permit training of men who will be able to remain in service.

A statement concerning the conference, which was issued by the Office of Defense Transportation, declared that the management and labor representatives emphasized

the fact that in offering the 13-point program they were not "seeking to change the provisions of any existing labor contracts."

Pennsylvania Makes Track Awards for 1942

In accordance with customary practice on the Pennsylvania, letters of commendation have been received from their superior officers by those supervisors of track whose territories were maintained to the highest degree of excellence in 1942. During the year, periodical inspections were made by special track inspection committees headed by the chief engineers maintenance of way of the respective regions. During these inspections, territories of the various supervisors of track were rated for line, surface and general improvement, and the letters of commendation were sent by their superior officers to the supervisors whose territories received the highest ratings. Following are the names of the supervisors and their assistants who received commendation:

New York Zone—New York division—S. M. Rodgers, Trenton, N. J., and E. E. Zacharias, Jr., (assistant). Long Island railroad—W. L. Steltzer, Jamaica, N. Y.

Eastern Region—Maryland division, main line—G. C. Vaughan, Wilmington, Del., and G. A. Sargent, Jr., (assistant). Maryland division, branch line—Norman Olsen, York, Pa. Middle division, main line—A. W. Miller, Huntingdon, Pa., and J. L. Spinelli, (assistant). Middle division, branch line—R. H. Joyce, Tyrone, Pa. Philadelphia to Harrisburg, main line—J. H. Kerchner, Lancaster, Pa., and C. H. Kooser, (assistant). Philadelphia division, branch line—N. V. R. Hunter, Earnest, Pa. Philadelphia Terminal division—L. W. Green, Philadelphia, Pa., and I. C. Golab, (assistant). Delmarva division—H. S. Unangst, Harrington, Del. Williamsport division, H. J. Lattomus, Northumberland, Pa. Wilkes Barre division—R. S. Dunkle, Sunbury, Pa.

Central Region—Entire region—J. P. McGhee, Coshocton, Ohio. Eastern division—C. P. Sipe, Federal street, Pittsburgh, Pa. Pittsburgh division, main line—G. M. Sauvain, Trafford, Pa. Conemaugh division—W. J. Gilbert, New Kensington, Pa. Monongahela division—R. G. Davis, Shire Oaks, Pa. Buffalo division—A. M. Kennedy, Mt. Morris, N. Y. Renovo division—G. W. Peoples, Kane, Pa. Panhandle division, branch line—A. C. Haines, Zanesville, Ohio. Cleveland division—W. C. Bowser, Orrville, Ohio. Erie and Ashtabula division—W. M. Myers, New Castle, Pa.

Western Region—Chicago Terminal division—W. P. Conklin, Colehour, Ind. Fort Wayne division—Charles Weiss, Valparaiso, Ind. Logansport division—John Nowviskie, Crown Point, Ind. Toledo division—Darel DeVore, Marion, Ohio. Grand Rapids division—H. B. Sutherlin, Grand Rapids, Mich. St. Louis division—W. R. Garner, Terre Haute, Ind. Indianapolis division—G. M. Smith, Columbus, Ind. Columbus division—A. J. Roper, Richmond, Ind. Cincinnati division—J. E. Chubb, Cincinnati, Ohio.

In addition, the track foremen whose territories were maintained to the highest degree of perfection on the respective supervisor's subdivisions were commended.

Association News

Wood-Preservers' Association

The Executive committee has changed the plans for the 1943 annual meeting to transfer it from the regular three-day meeting scheduled to be held at Cincinnati, Ohio, on April 27-29, to a one-day meeting at Chicago on April 27. Prompted by the desire to reduce travel, the committee is planning a "token" meeting of members living in Chicago and is requesting that other members do not come to the meeting unless other business brings them there. This "war-time meeting" will be held at the Palmer House and will comprise morning and afternoon sessions confined to the consideration of reports of technical committees and other urgent business.

Maintenance of Way Club of Chicago

The February meeting of the club, held on February 23, with 151 members and guests in attendance, was addressed by Charles W. Gennet, Jr., vice-president, Sperry Rail Service, Chicago, who spoke on Rails—Yesterday, Today and Tomorrow. In his address, Mr. Gennet reviewed the history of the development of rail, discussed the record and trend in rail failures in recent years, and challenged railway men to find a solution to present rail ills through better design, metallurgy and mill practices. The next meeting of the club will be held on March 22, at the Ambassador Room of Huyler's Restaurant, Straus Building, 310 S. Michigan Ave.

American Railway Engineering Association

Early in February members received bulletin No. 437, which contained committee reports on Roadway, Ties, Rail, Track, and Wood Preservation, these being the last of the technical reports to be acted upon during the current association year. Later in the month the association sent to all chief engineering officers of member roads of the A. A. R., in pamphlet form, a special report of the Committee on Buildings, on The Use of Substitutes for Critical Building Materials, this report having been prepared upon the request of the Board of Direction in the interest of the conservation of critical materials in railway building work during the war emergency.

Bulletin No. 438, for March, will be published about the middle of the month. This bulletin will contain, in addition to the president's report to members and the reports of the secretary and the treasurer, a completely revised membership list, a list of the membership classified by railroads, and the constitution of the association.

In lieu of the annual meeting in March, which was called off by the Board of Direction at its meeting in December, the reports of the various committees, together with such written discussions of them as have been received, are being reviewed by a special committee of the Board. Following the completion of this work, such material as has been recommended for publication in the Manual will be submitted for letter ballot approval of members. The reports, discussions and letter-ballot decisions will then be published in the Proceedings of the association for distribution to members as in past years, and divisions of or additions to the Manual approved through the letter ballot will be issued in the annual supplement to the Manual.

Tentative instructions covering outline of work and personnel of committees were forwarded to chairmen of committees early in December, and indications are that many of the committees have proceeded with the reorganization of sub-committees to continue their uncompleted assignments and to consider the subjects newly assigned. These tentative instructions to committees will be reviewed during the month by the committees of the Board on Outline of Work and Personnel of Committees to incorporate such revisions as may be required as a result of the letter ballot action, and corrected information will be furnished to committee chairmen and members about April 1 in the President's Message—Outline of Work and Personnel of Committees pamphlet to be issued at that time. None of the technical committees of the association met during February, and none has scheduled a meeting in March.

Roadmasters Association

This association has completed the organization of its technical committees for the current year and these committees are now actively engaged in the investigation of the subjects assigned to them. The problems under investigation by the committees and the personnel of these committees follow:

No. 1—Getting the Most from Crossties—C. Halverson (chairman), rdm., G. N. Grand Forks, N. D.; M. D. Packham (vice-chairman), rdm., A. T. & S. F., Emporia, Kan.; R. H. Campbell, supvr., Sou., Oxford, N. C.; A. B. Chaney, dist. engr., M. P., Little Rock, Ark.; M. L. Denney, trk. supvr., Indpls. Union Ry., Indianapolis, Ind.; W. T. Donoho, dist. engr., G. C. & S. F., Galveston, Tex.; J. H. Kieth, supvr., Western Ry. of Ala., Montgomery, Ala.; G. B. McClellan, gen. rdm., T. & P., Alexandria, La.; F. J. Meyer, ch. engr., N. Y. O. & W., Middleton, N. Y.; P. F. Muller, rdm., C. & W. I., Chicago; W. H. Sparks, gen. insp. trk., C. & O., Russell, Ky.; R. D. Thomas, rdm., Seaboard, Raleigh, N. C.; and J. S. Vreeland, associate editor, *Railway Engineering and Maintenance*, Chicago.

No. 2—Educating Track Labor in the Salvage of Material—C. F. Edwards (chairman), asst. div. engr., C. & O., Columbus, Ohio; I. B. Clontz (vice-chairman), rdm., Sou., Rock Hill, S. C.; J. S. Anthony, supvr., Sou., Stratsburg, Va.; W. F. Bugbee, Eastern Ry. Supplies, New York; W. F. Chapman, div. engr., C. of Ga., Columbus, Ga.; B. Clark, trk. supvr., C. & E. I., Watseka, Ill.; Ralph E. Cramer, University of Ill., Urbana, Ill.; W. L. Fowler, div. rdm., D. M. & I., Two Harbors, Minn.; A. J. Johnson, rdm., C. & N. W., Redfield, S. D.; John Kirkland, supvr., C. R. I. & P., Topeka, Kan.; F. H. Masters, ch. eng., E. J. & E., Joliet, Ill.; V. P. Shepardson, rdm., T. C. & I., Ensley, Ala.; J. L. Tedesco, trk. supvr., Penna.,

Cadillac, Mich.; and O. H. Woolwine, asst. supt., N. & W., Norfolk, Va.

No. 3—Saving Labor Through the More Intensive Use of Equipment—R. H. Gilkey (chairman), div. engr., C. of G., Savannah, Ga.; A. L. Kleine (vice-chairman), div. engr., D. & R. G. W., Grand Junction, Colo.; M. R. Black, Insp. of Safety, L. & N., Lexington, Ky.; M. D. Clark, engr. m. w. & s., P. & N., Charlotte, N. C.; M. H. Dick, eastern editor, *Railway Engineering and Maintenance*, New York; F. A. Eastin, trk. supvr., C. & O., Peru, Ind.; R. L. Fox, rdm., Sou., Alexandria, Va.; A. M. Loveless, trk, supvr., C. & E. I., Chicago Heights, Ill.; W. C. McCormick, rdm., Seaboard, Savannah, Ga.; W. Rambo, div. engr., M. P., Nevada, Mo.; C. W. Russell, rdm., Sou., Greenville, S. C.; G. K. Sterling, rdm., C. & N. W., Eagle Grove, Iowa; and C. Weiss, trk. supvr., Penna., Valparaiso, Ind.

No. 4—Extending the Life of Switches, Frogs and Crossings—A. G. Reese (chairman), dist. engr., C. B. & Q., Galesburg, Ill.; R. B. Rust, Jr. (vice-chairman), trk. supvr., Sou., Chattanooga, Tenn.; R. W. Bonney, gen. rdm., Seaboard, Jacksonville, Fla.; F. G. Campbell, asst. ch. engr., E. J. & E., Joliet, Ill.; M. D. Carothers, div. engr., Alton, Bloomington, Ill.; C. O. Enlow, rdm., P. & S. F., Slaton, Tex.; J. H. Gibbs, rdm., M. P., Wichita, Kan.; A. B. Hillman, engr. m. w., C. & W. I.—Belt Ry. of Chicago, Chicago; H. E. Kirby, asst. engr., C. & O., Richmond, Va.; G. P. Palmer, engr. m. & c., B. & O. C. T., Chicago; E. Schoech, rdm., C. M. & St. P. & P., Marion, Iowa; and A. W. Schroeder, rdm., C. B. & Q., Central City, Iowa.

No. 5—Housing Track Labor—L. E. Smith (chairman), rdm., M. P., St. Louis, Mo.; T. L. Williamson (vice-chairman), rdm., S. P., Winnemucca, Nev.; G. B. Aydelotte, rdm., D. & S. I., Sulphur Springs, Colo.; A. E. Botts, asst. engr., m. w., C. & O., Richmond, Va.; Armstrong Chinn, ch. engr., Alton, Chicago; A. J. Dillard, rdm., A. T. & S. F., Dodge City, Kan.; C. H. Higgins, div. engr., B. & M., Concord, N. H.; N. D. Howard, managing editor, *Railway Engineering and Maintenance*, Chicago; G. S. King, trk. supvr., Sou., Chester, S. C.; P. L. Koehler, div. engr., C. & O., Ashland, Ky.; R. Marshall, dist. rdm., G. N., Superior, Wis.; W. H. McNairy, trk. supvr., Sou., Batesbury, S. C.; R. E. Vandivort, rdm., P. & L. E., Pittsburgh, Pa.; and A. H. Whisler, asst. engr., Penna., Philadelphia, Pa.

No. 6—Reducing the Use of Revenue Cars in Non-revenue Service—J. M. Miller (chairman), trmstr., W. M., Cumberland, Md.; J. B. Kelly (vice-chairman), gen. rdm., M. St. P. & Sau. St. Marie, Stevens Point, Wis.; W. E. Amburgy, trk. supvr., C. & O., Mt. Sterling, Ky.; E. J. Brown, engr. of trk., C. B. & Q., Chicago; W. O. Frame, div. supt., Ft. W. & D. C., Wichita Falls, Tex.; S. J. Hale, asst. supt., N. & W., Roanoke, Va.; G. W. Mehaffey, asst. supvr., Sou., Dalton, Ga.; C. P. Nicholson, asst. ch. engr., Nor. & Sou., Norfolk, Va.; J. A. Rust, rdm., Sou., Winston-Salem, N. C.; G. L. Sitton, ch. engr., m. w. & s., Sou., Charlotte, N. C.; C. B. Wilkes, trk. supvr., C. & E. I., Villa Grove, Ill.; and R. B. Yost, trmstr., A. T. & S. F., Chillicothe, Ill.

Personal Mention

General

J. N. Fraine, roadmaster on the Canadian Pacific at Fort William, Ont., has been promoted to assistant superintendent at Lethbridge, Alta.

R. E. Butler, chief engineer of the Newburgh & South Shore, has been elected vice-president and chief engineer, with headquarters as before at Cleveland, Ohio.

W. C. Pruett, district engineer of the South Texas district of the Missouri-Kansas-Texas, with headquarters at Smithville, Tex., has been promoted to superintendent of the Northwestern district at Wichita Falls, Tex.

R. H. Carter, division engineer of the Chicago Terminal division of the Illinois Central, has been promoted to assistant terminal manager, Chicago Terminal, with headquarters as before at Chicago.

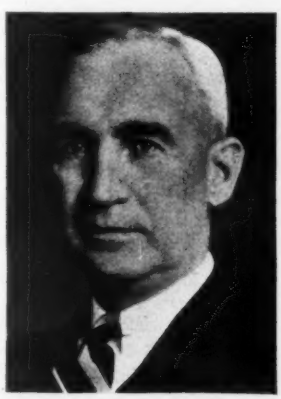
M. D. Clark, engineer of maintenance of way and structures of the Durham & Southern at Charlotte, N.C., has been appointed superintendent in charge of the transportation, roadway and mechanical departments, with headquarters at Durham, N.C., succeeding **T. B. Smith,** deceased. The position of engineer maintenance of way and structures has been abolished.

William D. Wiggins, chief engineer of the Pennsylvania system, has been promoted to vice-president — engineering, with headquarters as before at Philadelphia, Pa. Mr. Wiggins was born on April 28, 1873, at Richmond, Ind., and graduated from Rose Polytechnic Institute in 1895. Shortly thereafter, he entered railroad service as an assistant in the engineer corps of the Pittsburgh, Cincinnati, Chicago & St. Louis (now part of the Pennsylvania), serving in that capacity at Logansport, Ind., and at Pitts-

William D. Wiggins

burgh, Pa. He held various positions in the maintenance of way and construction departments, and on June 10, 1901, was appointed engineer of maintenance of way of the Cincinnati & Muskingum Valley (now part of the Pennsylvania) at Zanesville, Ohio. In October of the same year, he became engineer of the Cleveland & Mariette (now part of the Pennsylvania) and in 1902 he became engineer maintenance of way of the Toledo, Walholding Valley & Ohio (now also part of the Pennsylvania). In 1904 he returned to the Pittsburgh, Cincinnati, Chicago & St. Louis as division engineer at Pittsburgh. In 1912, Mr. Wiggins became division superintendent of the Vandalia (now part of the Pennsylvania) at Decatur, Ill., and in 1913 was appointed valuation engineer of the Pennsylvania, Lines West of Pittsburgh, with headquarters at Pittsburgh, serving in that capacity during federal control of the railroads. On March 1, 1920, upon the termination of federal control, he was appointed chief engineer of maintenance of way, Central region, with headquarters at Pittsburgh, and on April 1, 1926, he was promoted to assistant chief engineer, with the same headquarters. On February 1, 1927, he was appointed to the newly-created position of chief engineer of the Central region at Pittsburgh and on October 1, 1935, he became acting chief engineer of the system at Philadelphia. Mr. Wiggins was appointed chief engineer at Philadelphia in 1936 and remained in that position until his recent appointment.

James Farrand Pringle, an engineer by training and experience, whose appointment as general manager of the Atlantic region of the Canadian National, with



James Farrand Pringle

headquarters at Moncton, N.B., was reported in the February issue, was born on June 3, 1885, at Cornwall, Ont. Mr. Pringle began his service with the Canadian National in November, 1919, as an assistant engineer at Montreal and continued in that position until 1923, when he was appointed transportation engineer to the chief of transportation. In 1925 Mr. Pringle became assistant to the chief of transportation and later served as assistant general superintendent of transportation. In August, 1932, he was appointed general superintendent of transportation of the Canadian National, and in 1936 he became general superintendent, Southern Ontario district. Mr. Pringle was appointed chief of trans-

portation at Montreal in September, 1941, and remained in that position until his recent appointment as general manager.

Engineering

L. H. Powell, assistant engineer of the Atchison, Topeka & Santa Fe at Chicago, has been promoted to assistant to the chief engineer, system, with the same headquarters.

C. H. Sandberg, assistant engineer in the bridge department of the Atchison, Topeka & Santa Fe at Chicago, has been promoted to assistant bridge engineer, system, effective March 15, with the same headquarters.

J. L. Beckel, assistant engineer in the office of the engineer of structures of the New York Central, Lines Buffalo and East, has been promoted to engineer of bridges of the Lines Buffalo and East, with headquarters as before at New York, to succeed **A. W. Carpenter,** who has retired, effective March 1.

D. W. Fry, senior assistant engineer of the Baltimore & Ohio, has been appointed principal assistant engineer, with headquarters as before at Baltimore, Md. **R. E. Kennedy,** assistant to chief engineer, has been appointed office engineer, with headquarters as before at Baltimore, succeeding **J. H. Milburn,** who has retired.

James F. Zanolio, division engineer on the Denver & Rio Grande Western at Grand Junction, Colo., has been transferred to Salt Lake City, Utah, succeeding **A. L. Kleine,** who, in turn, has been transferred to Grand Junction, relieving Mr. Zanolio. **W. A. Peck,** locating engineer for the Defense Plant Corporation in Utah, has completed his assignment and has returned to the D. & R. G. W. as assistant engineer at Denver.

George W. Gallier, whose promotion to assistant chief engineer of the Lines East of the Missouri River of the Chicago,

George W. Gallier

Burlington & Quincy, with headquarters at Chicago, was reported in the February issue, was born at Bowling Green, Ohio, on November 4, 1884, and graduated in civil engineer from Ohio Northern university in 1909. He entered railway service in September, 1909, as a rodman on a location survey party on the C. B. & Q., and later worked successively as instrumentman and assistant engineer on location, maintenance and valuation work. In 1931, he was promoted to assistant engineer, with headquarters at Chicago, supervising surveys, making estimates and later carrying out work in connection with changes in line necessitated by U. S. Government dams on the Mississippi river for the nine-foot water way. Mr. Gallier also handled claims against the government covering the cost of this work. His promotion to assistant chief engineer was effective February 1.

G. L. Moody, roadmaster on the Missouri-Kansas-Texas at Muskogee, Okla., has been promoted to district engineer of the South Texas district, with headquarters at Smithville, Tex., succeeding **W. C. Pruett,** whose promotion to superintendent of the Northwestern district is reported elsewhere in these columns. **Fred Hunter** has been appointed district engineer of the Northern district, with headquarters at Parsons, Kan.

John L. Gressitt, assistant chief engineer—maintenance, of the Pennsylvania system, has been promoted to chief engi-

John L. Gressitt

neer of the system, with headquarters as before at Philadelphia, Pa., succeeding **William D. Wiggins,** whose promotion to vice-president — engineering is noted elsewhere in these columns. **Samuel Reed Hursh,** chief engineer maintenance of way of the Eastern region, with headquarters at Philadelphia, has been appointed assistant chief engineer—maintenance to succeed Mr. Gressitt. **C. F. Trowbridge,** division engineer on special duty in the office of the chief of freight transportation at Philadelphia, has been promoted to assistant chief engineer of the system. **W. R. Parvin,** engineer maintenance of way on the Southwestern division at Indianapolis Ind., has been advanced to chief engineer, maintenance of way, of the Eastern region, succeeding Mr. Hursh, while **E. D. Flad,** engineer maintenance of way on the Southern division at Wilmington, Del., has been transferred to the Southwestern division, succeeding Mr. Parvin. **P. X. Geary,** division engineer on the Philadelphia division, with headquarters at Harrisburg, Pa., succeeds Mr. Flad as engineer maintenance of way on the Southern division. **Glenn A. Williams,** division engineer of the Chicago terminal division, has been transferred to the Philadelphia division, succeeding Mr. Geary. **John F. Swenson,** division engineer of the Logansport division, has been transferred to the Chicago Terminal division, succeeding Mr. Williams, and **E. E. Kinzel,** division engineer of the Cleveland division replaces Mr. Swenson. **Richard W. Grigg,** division

Samuel Reed Hursh

engineer of the St. Louis division, with headquarters at Terre Haute, Ind., has been transferred to Cleveland, Ohio, succeeding Mr. Kinzel, and **K. J. Silvey,** division engineer of the Monongahela division, with headquarters at Pittsburgh, Pa., has been transferred to the St. Louis division, succeeding Mr. Grigg.

Roger W. Speidel, supervisor of track of the Philadelphia division of the Pennsylvania, has been promoted to division engineer of the Indianapolis division, with headquarters at Indianapolis, Ind. He succeeds **Lewis G. Walker,** who has been transferred to the Columbus division, with headquarters at Columbus, Ohio. **Morton S. Smith, Jr.,** division engineer of the Columbus division, has been transferred to the Long Island Railroad (a subsidiary of the Pennsylvania), with headquarters at Jamaica, N.Y., relieving **George M. Hain,** who has been transferred to the Monongahela division, replacing Mr. Silvey.

Mr. Gressitt was born at Baltimore, Md., on April 4, 1887, and attended the Baltimore Polytechnic Institute and Lehigh university, graduating in civil engineering from the latter school. He entered railway service on August 4, 1908, with the engineering corps on the Pittsburgh division of the Pennsylvania, being advanced through the positions of chainman, rodman and transitman. On May 1, 1915, he was promoted to assistant supervisor of track on the Bellwood division, later serving in that capacity at Williamsport, Pa., Philadelphia and on the Monongahela division, and later being promoted to supervisor, in which capacity he served during the next seven years successively on the Monongahela, Philadelphia Terminal and Pittsburgh divisions. He was promoted to division engineer of

the Fort Wayne division on January 16, 1927, being further advanced to division superintendent at Sunbury, Pa., on De-

C. F. Trowbridge

cember 1, 1929. On November 1, 1931, he was promoted to general superintendent of the Southwestern division, later being transferred to Chicago. On January 1, 1936, he was promoted to chief engineer, maintenance of way, of the Western region. He held that position until October 1, 1940, when he was promoted to assistant chief engineer—maintenance of the system, with headquarters at Philadelphia.

Mr. Hursh was born on March 20, 1894, at Mifflinburg, Union County, Pa., and was graduated in civil engineering from Pennsylvania State College in 1916. He entered railroad service on June 24, 1916, as a chainman on the Philadelphia Terminal division of the Pennsylvania and served as a rodman on the Tyrone division from January to May, 1917, when he was furloughed for military service. From January to June, 1919, Mr. Hursh was assistant supervisor of the Maryland division of the Pennsylvania, and subsequently was transferred successively to the general office at Philadelphia, the Delaware division, the Williamsport division, the Baltimore division, and the Maryland division. On October 9, 1926, he became supervisor of the West Jersey & Seashore (now Pennsylvania - Reading Seashore Lines) and on October 1, 1927, he was appointed supervisor of the Philadelphia Terminal division of the Pennsylvania. On November 10, 1928, he became division engineer of the Atlantic division and the West Jersey & Seashore, being transferred to the Philadelphia Terminal division on December 16, 1929, and to the Pittsburgh division July 1, 1933. On October 1, 1934, Mr. Hursh was appointed superintendent of the Wilkes-Barre division, being transferred to the Maryland division on April 1, 1935. On July 16, 1938, he became engineer, maintenance of way, of the Eastern Pennsylvania division, and he was appointed acting chief engineer, maintenance of way, of the Eastern region in October, 1940. Mr. Hursh became chief engineer maintenace of way, of the Eastern region at Philadelphia in June, 1941.

Mr. Trowbridge was born at Lynn, Mass., and graduated from Princeton university. He entered the employ of the Pennsylvania in 1925 as a rodman on the Pittsburgh division. He became a division engineer in 1933, and on September 1, 1940, after serving in that capacity on various divisions, he was transferred to Philadelphia, on special duty in the office of the chief of freight transportation.

John L. Starkie, assistant engineer of the Gulf, Colorado & Santa Fe at Galveston, Tex., has been promoted to office engineer, with the same headquarters. He relieves **G. L. Marick,** assigned to other duties at his own request.

Harry F. Kimball, instrumentman on the Chicago, Burlington & Quincy at St. Joseph, Mo., has been promoted to division engineer, with headquarters at Hannibal, Mo., succeeding **C. C. Robnett,** who has been transferred to St. Joseph. Mr. Robnett replaces **Roger H. Johnston,** whose death on January 14 was reported in the February issue.

S. A. Cooper, resident engineer of the Gulf, Mobile & Ohio, with headquarters at Mobile, Ala., has taken over the duties of **J. R. Harris,** assistant engineer at mobile, who has enlisted in the U. S. Marines. **J. W. Wolfe,** assistant engineer at Mobile, has received a commission as lieutenant, junior grade, in the U. S. Navy and his duties assigned to others.

P. J. Seidel, supervisor of track on the Marion division of the Erie, with headquarters at Huntington, Ind., has been promoted to assistant division engineer at Salamanca, N. Y., succeeding **R. J. Pierce,** who has been transferred to Buffalo, N. Y., to replace **Paul L. Crowe,** who has been transferred to Youngstown, Ohio, where he replaces **Ronald H. Jordan,** whose appointment as division engineer, with headquarters at Marion, Ohio, was noted in the January issue.

F. A. Poling, whose promotion to assistant to the engineer of maintenance of way and structures of the Wheeling & Lake Erie, with headquarters at Brewster, Ohio, was reported in the February issue, was born at Ada, Ohio, on April 16, 1904, and graduated in civil engineering from Ohio Northern University in 1926. He entered railway service in June, 1924, as a transitman on the W. & L. E. at Brewster, returning to school in September, 1925. In June, 1926, he returned to the W. & L. E. as a draftsman and in May, 1928, he went with the Montour Railroad in the engineering department at Coraopolis, Pa. Mr. Poling returned to the W. & L. E. in February, 1929, as a field engineer in the maintenance of way and structures department, which position he held until his recent promotion.

J. L. Cox, who has been appointed division engineer of the Erie division of the New York Central, with headquarters at Erie, Pa., as reported in the February issue, entered railway service on October 1, 1912, with the Chicago, Indiana & Southern (now part of the New York Central) at Streator, Ill. In June, 1925, he was transferred to Chicago, where he held various positions in the office of the division engineer of the New York Central. Four years later, he was appointed assistant supervisor of track at Elkhart, Ind., and in February, 1933, he became an assistant engineer for the Chicago Terminal district of the New York Central System. In November, 1937, Mr. Cox was transferred, with the same headquarters, to the Lines West of the New York Central, which position he held until July, 1940, when he was transferred to Cleveland, Ohio. In April, 1942, he was transferred to the office of the engineer maintenance of way of the system at New York, where he remained until his recent promotion to division engineer.

Charles W. Breed, whose promotion to engineer of standards of the Chicago, Burlington & Quincy was reported in the February issue, was born at Quincy, Ill., on December 17, 1878, and entered railroad service in May, 1898, as a clerk and timekeeper on the Burlington at Chicago. In 1903 he was promoted to draftsman, being advanced to chief drafsman with the same headquarters in 1908. In 1915 he became office engineer and in May, 1917, he entered military service. After serving in France as a member of the staff of the

Charles W. Breed

chief engineer, First Army, Mr. Breed returned to the Burlington in June, 1919, and in 1935 was promoted to office engineer of the system, holding that position until his new appointment.

Allen M. Knowles, assistant engineer of structures of the Erie, has been promoted to engineer of structures, with headquarters as before at Cleveland, Ohio, succeeding **Frank A. Howard,** who has been appointed consulting engineer of structures, with the same headquarters. **Homer Allen Dise,** chief draftsman, has been promoted to assistant engineer of structures, succeeding Mr. Knowles. **Alfred A. Visintainer,** construction inspector, has been advanced to assistant engineer in the department of structures at Cleveland. Mr. Knowles was born at Corinna, Me., on June 22, 1879, and graduated from the University of Maine in 1904. He entered railroad service in June, 1905, as a structural draftsman on the Erie, at New York, and in November, 1906, was promoted to assistant engineer, structural department. In 1915 Mr. Knowles was advanced to assistant engineer, bridges and

buildings, and five years later became assistant engineer of structures, holding that position until his new appointment, effective February 1. In 1931 his headquarters were transferred to Cleveland,

Allen M. Knowles

when the Erie executive offices were transferred to that city.

Mr. Howard was born at Brockton, Mass., on December 17, 1872, and entered railroad service in 1895 as a clerk in the operating department of the New York, New Haven & Hartford. In June, 1896, he became a rodman on the Erie and in June, 1899, he was promoted to assistant engineer, bridge department, with headquarters in New York. In October, 1906, Mr. Howard was advanced to assistant engineer of bridges and buildings, with the same headquarters, and six years later he was promoted to engineer of bridges and buildings. In 1920 his title was changed to engineer of structures, which position he held until his recent appointment. In 1931 his headquarters were transferred from New York to Cleveland.

Mr. Dise graduated in civil engineering from the University of Pennsylvania in 1906 and became a draftsman with the

Homer Allen Dise

American Bridge Company at Elmira, N.Y., in June, 1906. In January, 1910, he entered railway service as a structural designer for the New York Central in connection with the electrification of the Hudson and Harlem divisions. Mr. Dise went with the Erie in September, 1918, as a structural designer and on March 1, 1920, he was promoted to chief draftsman, with headquarters at New York, later being transferred to Cleveland.

Mr. Visintainer was born at Mount Carmel, Pa., on October 11, 1903, and graduated in civil engineering from Lehigh University in 1926. He entered railway service on July 6, 1926, in the engineering department of the Erie on construction work at Youngstown, Ohio. On July 1, 1929, he was advanced to inspector and on January 1, 1939, he was promoted to construction inspector.

Ronald H. Jordan, assistant division engineer on the Erie, whose promotion to division engineer of the Canton division, with headquarters at Marion, Ohio, was announced in the January issue, was born on April 8, 1907, at Toledo, Ohio. Mr. Jordan studied one year at Toledo university and three years at Purdue university, graduating in civil engineering from the latter school in June, 1929. Immediately after leaving school, he entered railway service with the Erie as a rodman at Huntington, Ind., later being sent to Marion, where he served as levelman,

Ronald H. Jordan

transitman, rodman and track laborer. In March, 1933, Mr. Jordan became assistant section foreman at Akron, Ohio, being advanced to section foreman at Polk, Ohio, in Feburary, 1934. In July of the same year, he became general foreman at Cleveland, Ohio, and in May, 1936, he was promoted to track supervisor at Marion. In July, 1939, he was further advanced to assistant division engineer, with headquarters at Youngstown, Ohio, which position he held until his recent promotion.

Track

Ernest Colange, track foreman on the Columbus division of the Pennsylvania, has been promoted to assistant supervisor of track at Columbus, Ohio.

W. S. Pigford has been appointed roadmaster on the Ft. Worth & Denver City, with headquarters at Childress, Tex., succeeding **B. L. Daniels,** who has been granted a leave of absence for military service.

William Johnson has been appointed roadmaster on the Canadian National at Edmonston, Alta., succeeding **W. M. Paige,** whose promotion to bridge and building master at Kamloops, B.C., is reported elsewhere in these columns.

J. K. Yohe, assistant supervisor of track on the Pittsburgh & Lake Erie, has been promoted to supervisor of track, with headquarters at McKeesport, Pa., to succeed **M. J. Cagney,** who has retired, effective February 1.

J. J. Maher, assistant supervisor of track on the Central region of the Pennsylvania, has been promoted to the newly-created position of branch line supervisor of track on the New York division, with headquarters at Trenton, N.J.

W. H. Mayfield, section foreman on the Gulf, Mobile & Ohio at Newton, Miss., has been promoted to acting supervisor of track between Laurel, Miss., and Mobile, Ala. **W. G. Stubblefield,** assistant supervisor of track at Laurel, has enlisted as an ensign in the U. S. Navy.

Wayne Hutchins has been appointed supervisor of track on the New York Central (Big Four) at Washington, Ind., succeeding **W. H. Risley,** who has been transferred to Middletown, Ohio, replacing **Lyle Bristow,** who has entered military service.

L. J. Riekenberg, transitman on the Atchison, Topeka & Santa Fe at Chillicothe, Ill., has been promoted to roadmaster, with the same headquarters, succeeding **M. D. Packham,** who has been transferred to Emporia, Kan. Mr. Packham replaces **R. W. Adkins,** whose death on February 11 is reported elsewhere in these columns.

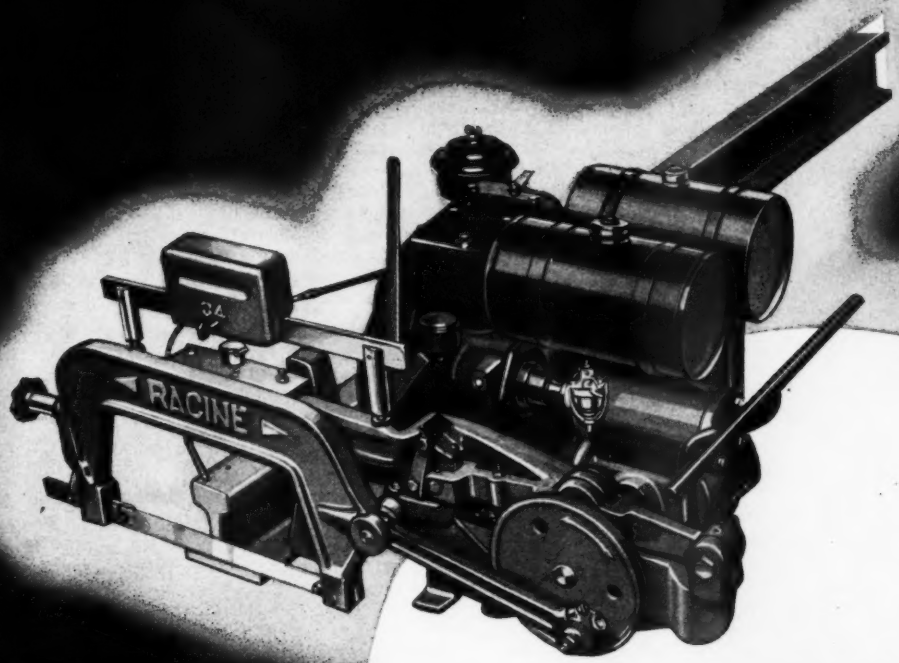
Melvin C. Erickson, assistant roadmaster on the Chicago & North Western at Boone, Iowa, has been promoted to roadmaster of subdivision No. 1, Nebraska division, with headquarters at Fremont, Neb., succeeding **A. W. Hyland,** who has been transferred to subdivision No. 4 of the Dakota division, with headquarters at Huron, S.D. Mr. Hyland relieves **George Corcoran,** who retired on March 1 after 50 years of service.

J. E. Rogan, Jr., acting supervisor of track on the Illinois Central at Mendenhall, Miss., has been promoted to supervisor of track at that point, succeeding **J. H. Blackburn,** whose death on January 4, after an illness of several months, is reported elsewhere in these columns. **E. F. Snyder,** instrumentman at Champaign, Ill., has been appointed to the newly created position of assistant supervisor of track on the Illinois division, with the same headquarters.

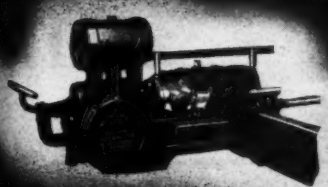
B. A. Hutson, supervisor of track of the Davenport, Rock Island & Northwestern, with headquarters at Davenport, Iowa, has been appointed roadmaster on the Chicago, Burlington & Quincy at Beardstown, Ill., succeeding **L. F. Drake,** who has been transferred to Galesburg, Ill. Mr. Drake relieves **C. L. Flinn,** who has been transferred to a newly created roadmaster's territory, in charge of the Chicago and Batavia branches, Eola yard and Mendota, Ill., to Denrock line.

J. T. McCarthy, general foreman on the Erie at Croxton, N.J., has been appointed supervisor of track, with headquarters at at Youngstown, Ohio, to replace **R. M.**

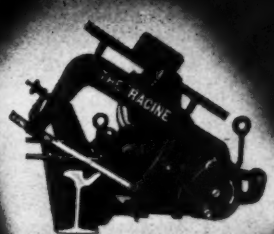
(Continued on page 236)



For all-around general use—Gasoline Engine operated—blower-cooled type, four cycle, one horsepower capacity.



For use on electric railroads—Electric Motor operated—with proper electrical characteristics for use on available power lines.



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For SIMPLE—FAST—SAFE *Cutting "On the Track"*— Now more than ever before, higher speeds, heavier and more frequent trains, carrying important war materiel, depend on sturdy flawless trackage. Racine Portable Rail Cropping Machines are designed and built to do the job of rail maintenance right "on the track"—no extra handling of equipment or rails—no need for using cars in non-revenue producing service. No delays incident to train movements while cutting and relaying rails.

The use of Racine Rail Cutters does away with over-heat or burn of grain structure—thus reducing split ends. It does not shatter rail ends as in the nick-and-break method.

RACINE RAIL CUTTERS—DO IT FASTER AND CHEAPER— Only one man required to operate—Results in big saving in power, tool and time costs. Any two men can easily transport cutter.

A Racine Rail Cutter will cut a standard 80-pound rail in five minutes—100-pound rail in seven minutes and a 130-pound rail in nine minutes.

Smooth and accurate facing of rail is assured when a Racine Rail Cutter is used. Any amount down to three-tenths of an inch can be cut from rail. Capacity for regular rails—7⅛″ x 6½″. Capacity for special or Trilby rails—9″ high x 6½″.

OTHER RACINE METAL CUTTING MACHINES— ***The Production Saws of Modern Industry***—Hydraulically fed and operated metal cutting machines for general purpose and production work in railroad repair and maintenance shops. Capacities 6″ x 6″ to 20″ x 20″.

RACINE HYDRAULIC PUMPS AND VALVES— Oil Hydraulic "Variable Volume" Pumps for pressures up to 1000 lbs. per sq. in. at capacities 0-12, 20 or 30 gal. per min. Hydraulic Valves—⅜″ to 1½″ standard pipe sizes—with mechanical, electrical and manual operating devices.

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Hills, who has been transferred to Cuba, N.Y., where he replaces **John Krizman,** who has been transferred to Huntington, Ind., to succeed **P. J. Seidel,** whose appointment as assistant division engineer is noted elsewhere in these columns. **J. G. Ainey,** general yard foreman at East Buffalo, N.Y., has been promoted to supervisor of track, with headquarters at Jamestown, N.Y., to succeed **W. E. Pierson,** transferred.

L. D. Shelkey, assistant supervisor of track on the Bessemer & Lake Erie at Greenville, Pa., has been advanced to supervisor of track, with the same headquarters, succeeding **J. M. Hunter,** whose death on January 20 is reported elsewhere in these columns. **R. A. Ullery,** draftsman, has been appointed assistant supervisor of track, relieving Mr. Shelkey.

Mr. Shelkey is 31 years old and graduated in civil engineering from the University of Pittsburgh in 1933. He entered railway service on April 1, 1936, as a rodman in the engineering corps of the Pennsylvania. On August 1, 1940, he was promoted to assistant supervisor of track and in December, 1940, he was appointed a draftsman. Mr. Shelkey went with the B. & L. E. as assistant supervisor of track on May 7, 1941.

Horace J. Pennington, whose promotion to general track supervisor on the Southern Pacific, with headquarters at San Francisco, Cal., was reported in the January issue, was born at Neame, La., on June 2, 1899, and entered railway service on July 19, 1920, as a painter on the Southern Pacific at Douglas, Ariz. In January, 1923, he was transferred to the track department as a student section formen and in August, 1923, he was promoted to section foreman. Mr. Pennington served as a section foreman and extra gang foreman on the Rio Grande and Tucson divisions until November, 1935, when he was advanced to roadmaster, with headquarters at Yuma, Ariz. In May, 1938, he was transferred to Colton, Cal., and in November, 1939, he was transferred to Ventura, Cal., where he remained until his recent promotion.

F. T. Boyar, section foreman on the Canadian Pacific at Edmonton, Alta., has been promoted to roadmaster at Consul, Sask., succeeding **G. S. Bradshaw,** who has been transferred to Bassano, Alta. Mr. Bradshaw replaces **R. B. Plowman,** who has been transferred to Drumheller, Alta., relieving **J. F. Earl,** who has retired because of ill health.

E. W. Willis, roadmaster at Outlook, Sask., has been transferred to Weyburn, Sask., succeeding **Edward Wallace,** who retired on January 31, following which a rearrangement of several roadmaster's territories on the Saskatchewan district was made as follows: **L. J. Crang,** roadmaster at Wilkie, Sask., was transferred to Outlook, Sask.; **W. A. Nimmo,** roadmaster at Swift Current, Sask., was transferred to Wilkie; and **S. G. Gustafson,** section foreman and relieving roadmaster, was promoted to roadmaster at Swift Current.

D. A. Livingstone, roadmaster at Brandon, Man., has been transferred to Fort William, Ont., succeeding **J. N. Fraine,** whose promotion to assistant superintendent at Lethbridge, Alta., is reported elsewhere in these columns. **J. A. Laughran,** roadmaster at Broadview, Sask., has been transferred to Brandon, relieving Mr. Livingstone, and **A. Holmstrom,** roadmaster at Minnedosa, Man., has been transferred to Broadview, replacing Mr. Laughran. **D. C. McLeod,** roadmaster at Brandon, has been transferred to Minnedosa, succeeding Mr. Holmstrom.

G. L. Thorne, roadmaster at Red Deer, Alta., has been transferred to Lloydminster, Sask., succeeding **A. Carlson,** who, in turn, has been transferred to Red Deer, replacing Mr. Thorne.

Bridge and Building

W. M. Paige, roadmaster on the Canadian National at Edmonton, Alta., has been promoted to bridge and building master at Kamloops, B.C., succeeding **Charles F. O'Connor,** who has retired after 46 years of railroad service.

Frank A. Reed, assistant supervisor of bridges and buildings on the Illinois Central at Clinton, Ill., has been promoted to supervisor of bridges and buildings, with the same headquarters, succeeding **S. C. Draper,** who retired on January 31.

W. N. Rust, assistant supervisor of bridges and buildings on the Southern Pacific at Portland, Ore., has been promoted to the newly created position of general bridge and building foreman on the Portland division. **Harold R. Demmon,** assistant supervisor of bridges and buildings in charge of bridge inspection, succeeds Mr. Rust and **C. Fest** has been appointed assistant supervisor of bridges and buildings in charge of bridge inspection, relieving Mr. Demmon.

Obituary

J. H. Blackburn, supervisor of track on the Illinois Central at Mendenhall, Miss., died January 4, following a long illness.

R. W. Adkins, roadmaster on the Atchison, Topeka & Santa Fe at Emporia, Kan., was killed in a motor car accident on February 11.

Edward W. Steele, assistant engineer in the office of the engineer of structures of the Erie at Cleveland, Ohio, died suddenly of a heart attack on December 21.

Harold S. Kellam, assistant division engineer of the Coast division of the Southern Pacific, with headquarters at San Francisco, Cal., died on January 27 at the General hospital, San Francisco.

E. L. Jenkins, supervisor of bridges and buildings of the Syracuse division of the New York Central, with headquarters at Syracuse, N.Y., died at his home in that city on February 10.

R. J. Jones, who retired in 1938 as bridge and building supervisor on the Mobile division of the Southern, with headquarters at Wilton, Ala., died on February 14 at Birmingham, Ala., after an illness of several weeks.

J. M. Hunter, supervisor of track on the Bessemer & Lake Erie, with headquarters at Greenville, Pa., was accidentally killed by a yard movement at Erie, Pa., on January 20. He was born at Sharpsville, Pa., on August 1, 1883, and attended Allegheny College for three years. He entered railway service on January 1, 1906, as an assistant extra gang foreman on the B. & L. E., later being advanced successively to section foreman, extra gang foreman and general foreman. He was promoted to supervisor of track on February 1, 1923.

A. C. Shields, former president and general manager of the Pittsburgh & Shawmut, with headquarters at Kittanning, Pa., and an engineer by training and experience, died on January 18. Mr. Shields was born at Eldon, Iowa, and attended Iowa State College, Ames, Iowa. He entered railroad service with the Chicago, Rock Island & Pacific and served in various positions in the engineering and operating departments until 1923. He then served until 1930 as engineer maintenance of way, assistant general manager and general manager of the D. & R. G. W. From 1930 to 1937 Mr. Shields was vice-president and general manager of the D. & R. G. W. at Denver, Colo. He was appointed vice-president and general manager of the Pittsburgh & Shawmut in April, 1940. On September 25, 1940, he was elected president and general manager, which position he held until September, 1942.

Supply Trade News

General

The Army-Navy "E" symbol for outstanding achievement in the production of war material has been awarded the **Caterpillar Tractor Company,** Peoria, Ill., and presentation of the "E" flag will be made at the plant on March 12.

The Cincinnati (Ohio) plant of the **Weir Kilby Corporation** has been awarded the Army-Navy "E" for the "doubling and then the tripling of production"; the first such award in this industry.

Personal

James R. Hewitt, formerly assistant to the vice-president, has been appointed vice-president of the **American Manganese Steel** division of the American Brake Shoe & Foundry Co.

F. B. Lounsberry, vice-president in charge of manufacturing of the **Allegheny Ludlum Steel Corporation,** has transferred his headquarters from Watervliet, N.Y., to the company's general offices at Brackenridge, Pa.

Charles A. Crane has rejoined **Templeton, Kenly & Co.,** Chicago, and has been appointed assistant to the president. Mr. Crane has been associated with this company at various times since 1899, when he entered its employ as vice-president and shop superintendent. He held this position until 1908 and, after engaging in

(Continued on page 238)

other work, was appointed assistant superintendent of the Union Drop Forge Company, Chicago, in 1914. In 1918, he was promoted to general superintendent and after conducting his own business in

Charles A. Crane

Cuba, he returned to Templeton, Kenly in 1920 as vice-president and works manager. He resigned from this company in 1932 to enter the construction field and from that date until 1936 was associated with the Follwell Engineering Company, Chicago.

W. P. Greenawalt, partner of **Young & Greenawalt,** Chicago, drainage engineers and fabricators of corrugated culverts and drainage systems, has been commissioned a lieutenant commander in the "Sea Bees," construction service of the U.S. Navy.

Robert H. Gibb, for the past several years a member of the Pittsburgh, Pa., district sales organization of the **Allegheny Ludlum Steel Corporation,** and recently assistant district manager, has been promoted to district manager of that office.

Ralph G. Detmer, general manager of the **American Frog & Switch Co.,** Hamilton, Ohio, has been elected vice-president of that company, a subsidiary of the

Ralph G. Detmer

Taylor-Wharton Iron & Steel Co., High Bridge, N.J. Mr. Detmer was born in Cincinnati and studied civil engineering at the Ohio Mechanics Institute in that city. In 1914 he joined the Weir Frog Company of Norwood, Ohio, as a draftsman, becoming chief draftsman in 1920. A year later, he went with the American Frog & Switch Co. as chief draftsman and was assigned the task of installing a new engineering system. He was promoted to chief engineer in 1923, to general superintendent in 1928 and to general manager in 1930. Mr. Detmer has been awarded two patents for railroad track improvements, one for a switch point protector made of manganese steel and the other for a manganese steel spring frog.

Bennett S. Chapple, formerly assistant to the vice-president, operations, in charge of emergency defense coordination, has been appointed assistant manager of sales of the New York district sales office of the **Carnegie-Illinois Steel Corporation.** Mr. Chapple, before the emergency, was the company's manager of sales promotion. He is succeeded by **Ross L. Leffler,** who, in addition to his duties as special representative, will coordinate emergency defense measures in the company and cooperate with public authorities and defense agencies.

As a result of extensive research on weed killing chemicals, the **General Chemical Company,** New York, has established a

Ralph N. Chipman

Weed Killing department, of which **Ralph N. Chipman** has been appointed manager. This department will offer a new weed killing product to the railways, known as Bysulox, for large-scale spray application by a simplified method. Mr. Chipman, who was born at Beverly, N.J., on February 14, 1886, was first employed by the George Chipman Company in 1906, and in 1909 became connected with the Atlas Preservative Company of America, New York. In 1916 he founded the Chipman Chemical Engineering Company, New York, which purchased the Atlas Preservative Company of America, and later changed its name to the Chipman Chemical Company, with headquarters at Bound Brook, N.J. Mr. Chipman continued as president of this company from 1917 until 1939, when he sold his interest and resigned. In 1940, Mr. Chipman was injured seriously in an explosion of a chemical plant that he was building at Portland, Ore. Following his recovery, in 1942, he was engaged by the General Chemical Company, to form the new Weed Killer department.

Carl S. Clingman, general sales manager of the transportation department of the **Johns-Manville Sales Corporation,** has been elected a vice-president of the company. **Albert C. Pickett,** formerly assistant sales manager of the Western division of the transportation department, has been appointed sales manager, Western division, with headquarters at Chicago; **John D. Johnson,** formerly Central

Carl S. Clingman

division sales manager, has been appointed acting sales manager, Eastern division, with headquarters at New York, to succeed **P. E. Redding,** who has been called to active duty as a lieutenant in the U. S. Naval Reserve; and **Fred Fix** has been appointed acting sales manager of the Central division at Cleveland, Ohio, to replace Mr. Johnson.

Mr. Clingman was educated at Northwestern university. He began his business career in 1904 as an apprentice with the Pullman Company, and was promoted to assistant general shop foreman at the Pullman, Ill., works in 1907. He was transferred to Wilmington, Del., as eastern mechanical inspector in 1908 and was promoted to general mechanical inspector at Chicago in 1909. He entered the service of Johns-Manville in 1917, as sales representative in the southwest. He was appointed sales manager of the western region in 1933, and general sales manager of the transportation department, with headquarters in Chicago, in 1935. As vice-president, Mr. Clingman will also continue in his previous capacity as general sales manager of the transportation department.

Mr. Pickett joined the engineering department of the Missouri-Kansas-Texas in 1916, remaining there until 1917, when he was transferred to the stores department and made storekeeper at Trinity, Tex. After serving in the Army during World War I, he returned to the M-K-T in 1920 to serve on the staff of the chief engineer. He joined the Johns-Manville Sales Corporation as sales representative in 1922, and was appointed division sales manager of the southwestern division, with headquarters at St. Louis, Mo., in 1933. He resigned from Johns-Manville in 1939, returning in 1941, as assistant sales manager of the western division.

An Exhibit
(in Print)

"Bill, I suppose you've heard that the A.R.E.A. has called off its convention," said the railway sales manager to his star salesman.

"Yes, I picked it up out on the road last week," replied the star salesman. "What happened?"

"They wanted to go along with the government's request for reduction in travel, I understand."

"But I'm told that this is the first time that this organization's ever abandoned its convention since it started forty-three years ago."

"That's true. They've gone through previous wars, boom periods and depressions without a break."

"I suppose that'll mean no exhibit."

"That's right. With no convention, there's no one to exhibit to except the people in Chicago."

"That'll mean, Boss, that we'll miss seeing a lot of our friends who always come to these meetings."

"That's true, and it's a big loss, Bill. Those exhibits save us a lot of traveling."

"Don't I know that? A lot of our friends always come from out-of-the-way places that are hard to reach. Seems like they come more'n the men from the big centers."

"We'll miss these men this year."

"That's right—what'll we do in place of the exhibit?"

"I'll tell you what I'm thinking about, Bill."

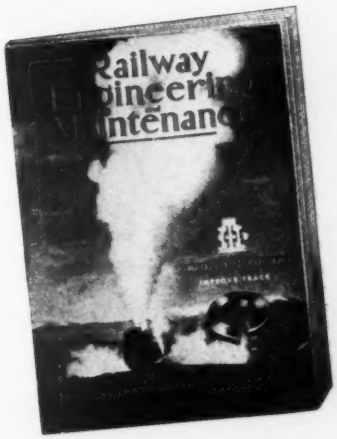
"What's that?"

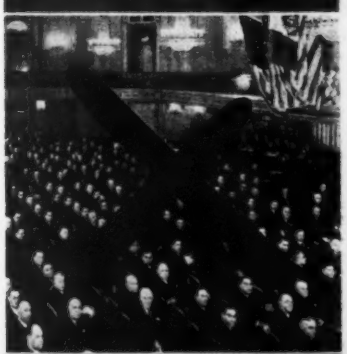
"More space in *Railway Engineering and Maintenance*. We can meet our friends in the pages of this magazine—not only in March but in the other months of the year too."

"And we'll reach all of them, too, Boss—including those who're never able to get away to attend the exhibit."

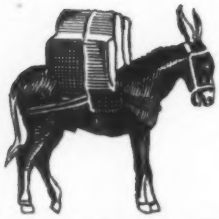
"That's right, Bill."

"That's a swell idea. We'll have our exhibit (in print) every month this year."





RAILWAY ENGINEERING AND MAINTENANCE IS READ BY MAINTENANCE OFFICERS OF ALL RANKS



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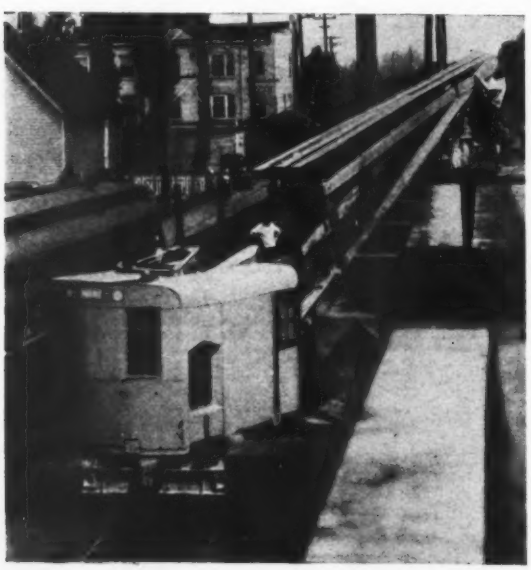
Because they have a 6,000 lb. draw bar pull, can draw and switch their own work trains *without a locomotive and crew*, they release badly needed LABOR and equipment for other work.

Because they do all types of lifting, pulling, loading, unloading, rail laying, bridge work, ballast spreading, etc.; can handle almost any maintenance situation with efficiency and dispatch, BURRO CRANES "Keep 'em Rolling."

Write for Bulletins F-100, F-110



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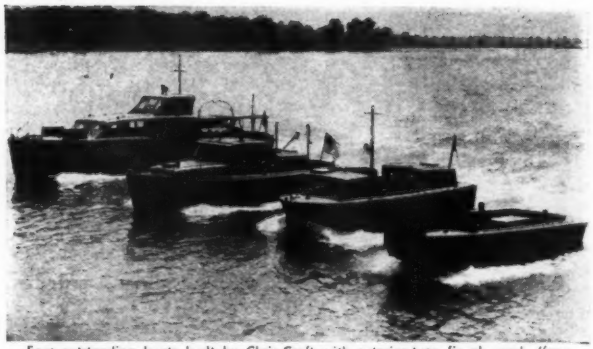

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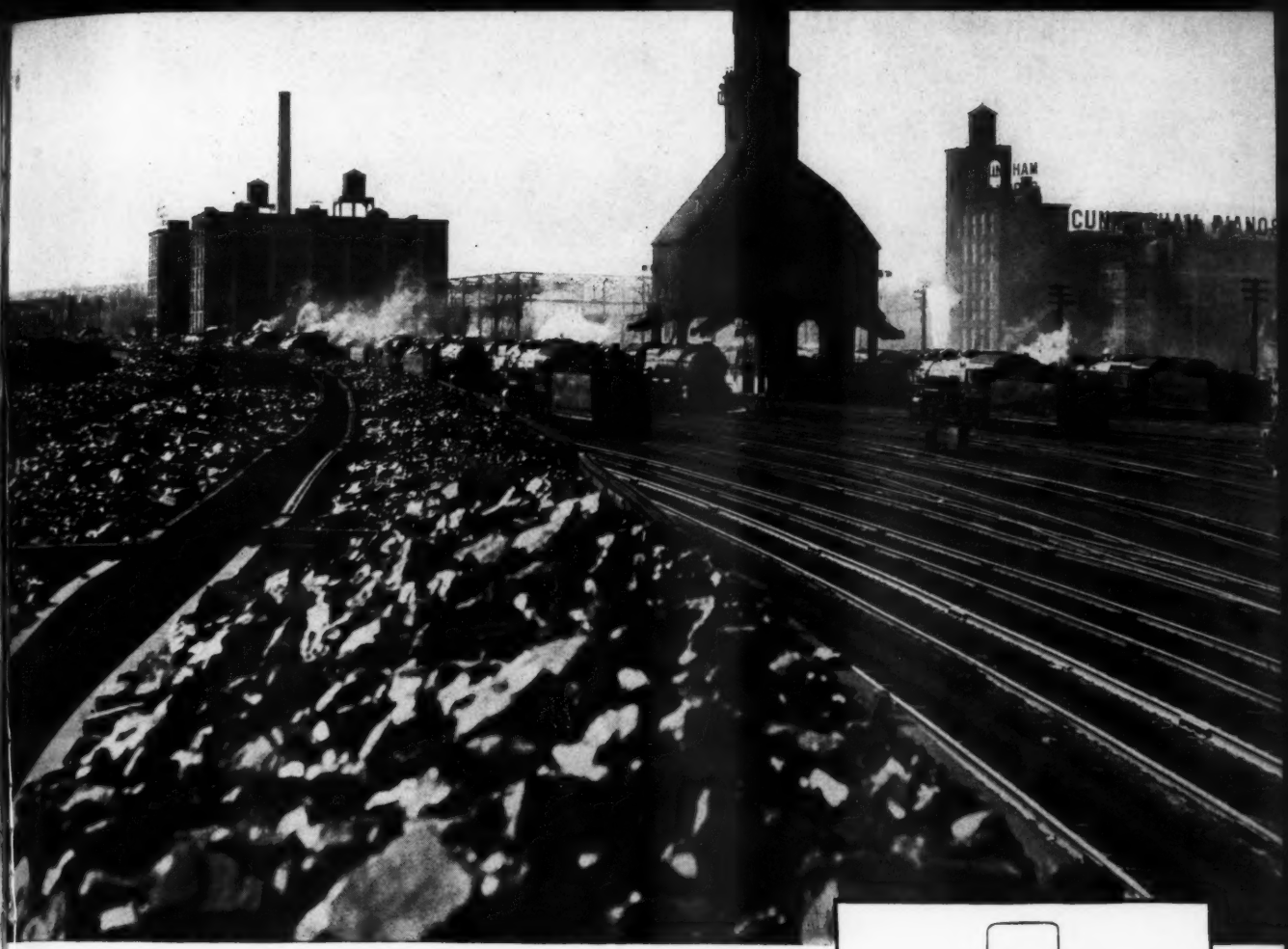

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